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Conveyor System Doubles Capacity

Furnace Maker Gets Away from Manual Handling
and Saves in Floor Space—Several
Unusual Devices

BY BURNHAM FINNEY*

TO double the capacity of a plant by reducing substantially the floor space previously occupied sounds like a paradox, but that is the achievement of the Monitor Furnace Co., Cincinnati, manufacturer of Caloric heating furnaces. Elimination of 6500 sq. ft. heretofore used for production purposes has been made. And the total output of the finishing and assembling departments has been increased 100 per cent by the installation of a conveying system for transporting rough castings through the finishing operations and thence to the warehouse to await shipment to customers. In addition, the mechanical handling of material has cut down the normal working force by 11 men, a considerable saving in labor cost thereby being effected. Furthermore, the use of conveyors has brought about other economies which, considered on an annual basis, amount to an impressive sum.

Certain castings, after leaving the foundry, are sent to the sand-blast department for cleaning. From that point they are lifted by air hoist on to carriages

which move on a two-rail conveyor a distance of approximately 200 ft. to a delivery conveyor. En route, however, the castings are ground, shipped, mounted and inspected. As they emerge from the sand-blast room they are ground while resting on a small turntable, which facilitates the operation.

After grinding, each casting is turned over, permitting the bottom to be chipped and inspected. This is accomplished by a novel device of the company's own invention. Two carriages, one empty and the other containing a casting, are moved to points within a few feet of each other. A workman then pushes a lever which, by air power, tilts the conveyor tracks occupied by the carriages toward each other, so that they approach a vertical position at the same point. In this way the casting is transferred from one carriage to the other and during the process is turned completely over.

For the convenience of the workmen in mounting the castings, and to facilitate production, a spur of the conveyor has been constructed, from a point about 100 ft. from the sand-blast room to the delivery conveyor,

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*SHOWING at
Left Center
the Process of
Turning Over
One of the Cast-
ings, to Permit
Work on the Op-
posite Side.
Movement of the
material along
the conveyor is
by hand power.
This is at sta-
tion A on dia-
gram*



so that two lines of castings are being mounted simultaneously. The mounting operation takes considerably more time than the process of grinding and chipping. Without the spur track, therefore, a congested condition would exist, with castings, ready to be mounted, backing up and interfering with the activities in the chipping department.

Some castings which do not pass through the sand-

transportation by hand has been eliminated by the installation of a conveyor on which the front rests in an inclined position, a reduction from 13 to four operations thereby being accomplished. These four operations include mounting, painting, drying, decorating and crating.

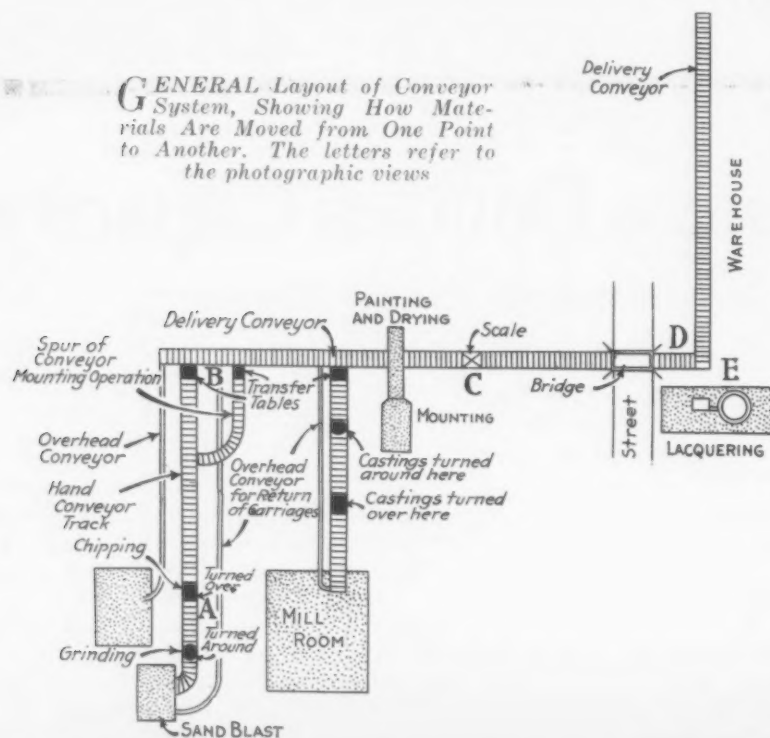
The paint conveyor dips various types of castings into tanks, three different colors being used. The castings then continue on the same conveyor through a drying oven and are brought back to the point from which they started. Here they are decorated. Upon removal from the paint conveyor they are crated and sent to the warehouse on the same delivery conveyor as the other castings.

At right angles to the hand-power conveyors is the delivery conveyor, which is operated by an 8-hp. motor. Feeding it are the conveyors from the sand-blast room and from the mill room. Castings are transferred on to the delivery conveyor, which is several feet higher than the hand-power conveyors, by means of an air-power transfer table.

After moving from 25 to 30 ft. on the delivery conveyor, the castings pass on to a scale which is an integral part of the conveyor. Here they are weighed and the record of the number of units sent to the warehouse is kept. This record affords an accurate index of the amount of finished work which the company has ready for shipment.

From the scale the castings, still on

GENERAL Layout of Conveyor System, Showing How Materials Are Moved from One Point to Another. The letters refer to the photographic views



CASTINGS Being Transferred from the Hand-Power Conveyors at Right to the Delivery Conveyor, Motor-Driven and Some Distance Above Them. This is at B on diagram

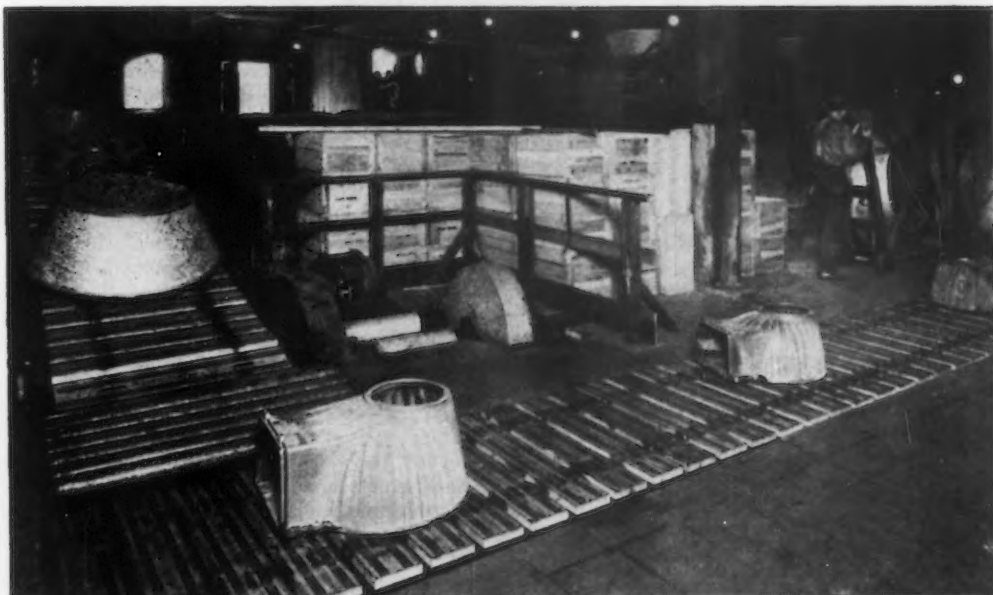
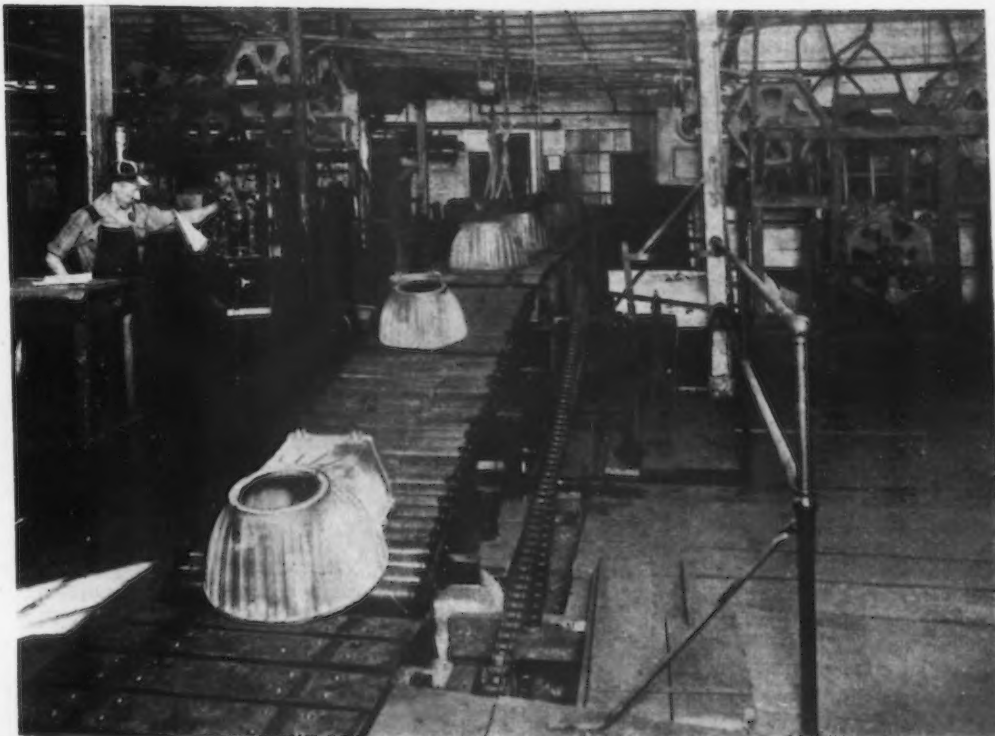
blast room go from the foundry to the mill room, where they are placed in large tumblers to be cleaned. After tumbling, the castings are placed on carriages and are lifted by a transfer table operated by air power on to a gravity conveyor similar in construction to that previously described. Here, also, they are turned over and turned around in the same manner as the castings progressing from the sand-blast room to the delivery conveyor, and are ground and chipped.

Parallel to the gravity conveyor is a department in which the fronts of the furnaces are mounted. Here

the conveyor, are run up a gradual slope and carried across a bridge, which passes over a street, and thence down into the warehouse. Here they move on to another conveyor, which is at right angles to the delivery conveyor, and which runs the length of the warehouse. This conveyor is level with the floor, and from it the castings are taken by hand and stored nearby. The entire length of the delivery conveyor is 500 ft., of which 300 ft. extends along the end of the finishing building and over the bridge into the warehouse.

At the point where the hand conveyors meet the de-

CASTINGS at Scale (Position C on Diagram) and Moving Toward the Reader. They are here on the long delivery conveyor which carries them across the bridge to warehouse



AT the Point Where the Delivery Conveyor (Left) Drops the Castings Upon the Warehouse Section of the System, Carrying Them to the Right for Storage or Shipment. This is at D on diagram

FURNACE Register on Revolving Drying Rack After Being Lacquered. By the time a revolution has been made, each register is ready for the next coat. This is at E on diagram



livery conveyor, the carriages on which the castings have been transported are placed on overhead power-driven conveyors and are returned to the sand-blast or mill rooms. One of these conveyors is utilized, also, to carry certain castings to the delivery conveyor after they have been chipped, ground and inspected.

Incidentally, in a room adjacent to the warehouse,

furnace registers are lacquered. After the first cast is applied, they are placed on a revolving drying rack 16 ft. in diameter with a capacity of 12 registers. By the time the rack has revolved once, the register is ready for a second coat.

The entire conveying system was designed and built by the company.

British Steels at London Engineering Exposition

"Spun-Sorbitic" Centrifugal Castings—Pig Iron with No More Than 3 Per Cent Carbon—Rustless Steels—Two Special Heat-Treating Processes

LONDON, ENGLAND, Sept. 24.—Although the present is only the ninth of the series, the London Shipping, Engineering and Machinery Exposition has, in point of age, reached its majority this year. The first exposition was held in 1906, and it now appears to have become an established biennial event in the engineering world. It possesses unique opportunities for representing the numerous industries concerned as fully as is possible under existing conditions. The present display at Olympia, London's largest exposition hall, shows that these opportunities have been made good use of. Brief descriptions of a few of the outstanding iron and steel exhibits are given hereunder.

Pig Iron with 3 Per Cent Total Carbon

The only concern which lays stress on pig iron in its exhibit is David Colville & Sons of Sheffield. This firm shows various grades of foundry iron, including a special refined variety guaranteed not to contain more than 3 per cent of total carbon. Several firms, on the other hand, show castings with claims to much higher quality than was formerly usual.

In particular centrifugal casting is represented in the displays of the Sheepbridge Stokes Centrifugal Castings Co., which has acquired the patents and associated plant of Stokes Castings, Ltd., and of Newton Chambers & Co., which has acquired similar control of the Hurst-Ball process formerly worked by Centrifugal Castings, Ltd., at Kilmarnock. Both undertakings exhibit piston ring drums and similar articles, and the Sheepbridge company also has die-cast gray iron rods for tool-room work, which are rough machined before delivery, and are said, therefore, to avoid the danger of blowholes becoming evident on finishing, in addition to having exceptional wearing properties.

Newton, Chambers & Co. is also exhibiting "spun-sorbitic" centrifugal castings, in which piston valve liners and cylinder liners for locomotive and internal combustion engines are produced in gray iron with silicon as low as 1.25 per cent, and the fine sorbitic structure that in the original German process was obtained by the use of red-hot molds. These castings are made up to 48 in. in diameter, 12 ft. in length and four tons.

From the Farringdon Steel Foundry of Leyland Motors, Ltd., come some fine iron and steel castings, made in oil sand molds, and exhibited with the actual feeder heads by which their soundness is assured. The firm of E. Green & Son show castings for their high pressure economizers; Thomas Firth & Son a variety of heavy steel castings; Hadfields, Ltd., toughened cast steel, and British Vulcanus, Ltd., firebars with a 50 per cent longer life than that of ordinary bars.

Rustless and Heat-Resisting Steels

The Hadfield display includes a variety of the firm's Era and Hecla special steels, and the Colville display includes the company's Ducol and other structural steels, but the majority of steelmakers have devoted their stands mainly or entirely to alloy steels, and especially to the many varieties of stainless, rustless, corrosion-resisting and heat-resisting steels that have been developed during recent years.

The exhibit of Brown Bayley's Steelworks is perhaps the most demonstrative of the extraordinary resistance to be obtained from a judicious choice of these materials. It consists largely of specimens of the firm's various brands of steel taken from actual service of all

kinds in a variety of works, little or none the worse for wear, after periods exceeding considerably the total life of the materials they replaced.

Chief interest at the Firth stand centered around the heat and corrosion-resisting Staybrite steel. In addition to the numerous applications of this steel in many branches of engineering, there is shown an extraordinary wire drawn from it to a thickness of one-half thousandth of an inch.

British Hardening Processes

Two very interesting processes of hardening steel are shown by Automatic & Electric Furnaces, Ltd., and the British Oxygen Co., respectively. The former is due to Messrs. Wild and Barfield and is based on taking as the criterion of the point at which steel should be quenched when it is being treated before hardening, not the temperature it has reached, but the disappearance of its magnetic properties. Thirty years ago Roberts Austen showed that carbon steel containing not less than 0.40 per cent of carbon ceased to be magnetic at the second arrest point on the heating curve, and was then nearly in the right condition to be quenched. The actual right condition was declared to be when the third arrest point was reached, and, having regard to the effect of the rate and duration of heating as well as the temperature reached, it was evident to the inventors that in the end attempts to determine that point by measurement of temperature were bound to be unsuccessful. Happily, however, the highest critical point coincides with the middle one for all steels containing over 0.4 per cent of carbon, and the disappearance of magnetic properties consequently becomes for such steels a sure indication that the steel is ripe for hardening. They therefore constructed a resistance furnace with a magnetic indicator, and by quenching at the point at which all magnetism disappeared they were able to obtain the best results.

Hardening Steel Gears

The process of the British Oxygen Co., known as the Shorter process, is for hardening the wearing faces of steel gears, and it consists in conducting the processes of heating and quenching mechanically, so that they occur in a regular and precise fashion. For this purpose the gear wheel is mounted on an adjustable spindle and placed on bearings within a tank of water, in which it is partly or wholly submerged as may be required. The gear is then revolved and the cone of an oxyacetylene blowpipe is traversed mechanically along the surface to be hardened, which is practically all that is allowed out of water. The blowpipe is followed immediately—also by mechanical means—by a jet of cooling water, and, in effect, no part of the gear is being heated at any time except that which is under the blowpipe cone.

When the operation is completed the tool and core of the wheel are unimpaired by the treatment, and only the wearing surface is hardened, although here the hardness penetrates to comparatively considerable distances, amounting up to as much as $\frac{1}{4}$ in. on large gear. Moreover, the gear is practically free from any sort of distortion. The mechanical arrangements prevent anything in the nature of overlapping, and overheating never occurs. In sum, the hardening is short and uniform, blending gradually into the normal structure.



Sponge Iron Process Plant at
Kuji, Japan.

Making Sponge Iron in Japan

Plant Built and Experience Gained at Kuji, Utilizing
the Anderson-Thornhill Process for Reducing
the Ferrous Sands of the District

TOKIO, JAPAN, Aug. 17.—Various reports appear regarding the success of the "sponge iron" plant which has been erected in Kuji, Iwate Prefecture, by E. B. Thornhill and H. G. S. Anderson. The plant is now in production. It is declared to be a metallurgical success and steel made from its product of high quality. The Japanese declare that the plant can be operated economically, but foreign engineers, pointing to inefficiencies and higher unit costs for labor, ore and coal, express doubts.

A correspondent for THE IRON AGE has interviewed both H. G. S. Anderson and Goro Matsukata, president of the Kuji Iron Works, and had access to unofficial sources of information.

Large Deposits of Ferrous Beach Sands

Kuji is a small town on the eastern coast of Japan, about 100 miles from the northern tip of the main island. In some earlier geologic period the coastline rose and now there is a strip of high table land, more than 100 miles long and about 20 miles broad, extending along the shore, with Kuji in the center. Government surveys have found that deposits of ferrous beach sand extend for about 70 miles, averaging about 18 ft. in thickness. One estimate, made by Government engineers in 1921, placed the total of such sand in one area of 22 sq. km. at 150,000,000 tons. The most conservative estimates give the entire area a minimum of 200,000,000 tons of ore. Others state that the field could fill Japan's present requirements of 2,000,000 tons of iron a year for several centuries.

In the feudal era of Japan, when the samurai carried their two swords, the metal for those famous blades came from an outcropping in the Kuji field. By the hand methods of the time the tiny particles were extracted (95 per cent of the ore will pass through a screen having 65 openings to the linear inch) and then worked into iron and steel of extremely high quality. The present Kuji plant is using sand from the original tunnels of this old sword industry.

Sponge Iron Furnace System Used

FOR more than ten years Goro Matsukata has been seeking some modern commercial method of utilizing this vast field of ore. Ordinary blast furnace smelting would be impracticable, as the tiny particles of ore would be blown out the top or would run from the bottom. Numberless experiments had failed prior to use of the Thornhill & Anderson process.

This process consists in the reduction of the common oxides of iron—hematite, limonite, magnetite and the calcines from the roasting of iron pyrite—at a tem-

perature low enough to prevent the melting of any of the iron or other constituents of the iron ore. This temperature lies between 500 and 1000 deg. C. No flux is used.

The beach sand ore is charged continuously through pipes to an annular hearth, sponge iron furnace. Coal, which has been partially distilled to drive off moisture and light volatiles, is charged with the beach sand in the approximate proportions of one part of coal to four parts of beach sand.

The annular hearth rotates slowly and heat is applied from the 72 carborundum tubes installed immediately above each hearth. Gas is burned in these tubes and the waste combustion gases do not mix with the gases formed over the rotating hearth, so that there is no danger of reoxidization of the particles of iron after they have once been reduced to the metallic state.

The rotating hearth is 12 ft. wide. As ore and coal pass across it they are mixed and the iron oxide is reduced to metallic iron. The particles of iron are the same size as the particles of ore. The time required for the charge to pass across the hearth is about 30 min. The finely divided metallic iron, together with the waste material in the original beach sands and the excess coal, is discharged continuously into revolving cylinders, rotating in water to cool the material to atmospheric temperature, to prevent the finely divided iron quickly burning back to iron oxide, which would occur if the temperature of discharge were too high.

This cooled material is then passed over magnetic separators, where the metallic iron (and a certain proportion of ilmenite, which is magnetic) is separated from the waste material. The ilmenite which is carried over reduces the grade of the iron somewhat. There is no particular disadvantage to this other than that the ilmenite must be charged into the melting furnaces later on.

The finely divided iron, commonly known as sponge iron, is then briquetted with special presses at 40,000 to 50,000 lb. per sq. in. pressure. The resulting briquet has a density about 75 per cent of that of solid iron, permitting it to be charged directly into open-hearth furnaces and insuring the sinking of the briquet below the slag line.

The temperature of the reduction is sufficiently low to prevent the reduction of phosphorus from its mineralogical compounds and thereby eliminates one of the most troublesome ingredients in many iron ores. The low temperature also prevents the reduction of titanium from the ilmenite, a feature considered highly desirable in the Kuji process.

The result is a very pure wrought iron with no com-

bined carbon present and without combinations of phosphorus or titanium. In order to make steel sufficient pig iron is added to produce the grade of steel desired.

Vicissitudes of the Development

Mr. Anderson and other foreign engineers have encountered many difficulties. He spoke no Japanese and naturally had some difficulty in having his orders transmitted. Workmen overran the plant while it was in course of construction and there were continually new and untrained men on the job. When operation was begun there were breakdowns as a result of the errors of untrained labor. There was difficulty with the coal supply, which originally was expected to come from a lignite mine near the plant.

Present Plant and Costs

FINALLY, however, one furnace went into production. The plant is equipped with two sponge iron furnaces, each with an outside diameter of 60 ft. and 12-ft. annular hearth. Original estimates were made on the basis of a capacity of 100 tons of ore a day for each furnace. The engineers, however, brought 24-hr. capacity up to 150 tons of ore and 50 tons of sponge iron. About 200 tons of the briquetted iron were sent to the Kawasaki Dockyard Co.'s plant near Kobe, where a steel of high quality was made from the sponge iron.

Mr. Anderson says that original estimates of production were based on the assertion that coal could be supplied the plant at not more than \$3 a ton delivered. The lignite near the plant, however, could not be used, as it clogged up the gas producers, and it became necessary to purchase coal from the Hokkaido mines at an average cost of \$7.50 a ton.

In an interview Goto Matsukata admitted that there

was too much labor being employed at present, but he pointed out that the average wage for a 12-hr. day is 90 sen, about 45 cents, and that attempts are being made to reduce the total number of workmen employed. He also said that, while the mining equipment has been erected at a site where only about 40,000 tons of ore can be recovered on the basis of 50 per cent recovery, excavation is under way between the plant and the original mine site on the high table land and shortly open-cut mining will be instituted at a considerable saving.

At present the cost per ton for ore delivered at the mine is about 1.14 yen. With open-cut mining, it is believed that this cost will be materially reduced. The coal problem, Mr. Matsukata admits, is the most difficult of solution. Hokkaido coal is still being used, but experiments are being made and it is believed that, with some adjustment in the gas producers, it will be possible to use the lignite as originally planned, thus reducing the cost of the coal used to less than half of the present charge. Already the lignite is being used in the reduction process, although it gives a higher ash content than the Hokkaido coal.

It is claimed that a ton of sponge iron can be made under present conditions for 21 yen (\$10.50) and can be sold for 38 to 40 yen (\$19 to \$20) a ton. The current market on pig iron is about 40 yen per ton for Indian iron and from 50 to 57 yen (\$25 to \$28.50) per ton for Kamaishi and Kenjiho iron. There is some difficulty being encountered in introducing this new product to the steel mills, which are unwilling to pay as much for it as for pig iron, but Mr. Matsukata believes that, once the mills have tested it and discovered that it is of high quality, there will be no difficulty in selling it at the current pig iron market.

Propose a National Census of Distribution

A national census of distribution, which will serve as a barometer of consumption and a guide for production, will be the outstanding project in the field of distribution to be considered at the meeting of directors and national councillors of the Chamber of Commerce of the United States to be held at West Baden Springs, Ind., Oct. 15 to 18.

Secretary Hoover has proposed that the first national census of this kind be taken in 1930. What steps can be taken by business in relation to the project and assist in the gathering of information which will be most effective in preventing the glutting of markets and the consequent demoralizing business slump will be discussed from the viewpoint of business as a whole and of many individual industries which will be represented at the meeting.

It is understood to be the idea of Mr. Hoover that a national census on distribution should be taken decennially, and should be like the census now taken on manufactures. The cost of a national distribution census has been estimated at \$2,000,000.

Change in Organization of Bureau of Standards

WASHINGTON, Oct. 4.—With a view to increasing efficiency through a better grouping of its activities, an important change in the administrative organization of the Bureau of Standards has been made. Dr. L. J. Briggs has been appointed assistant director, in charge of research and testing, while Ray M. Hudson becomes assistant director, in charge of commercial standards.

Dr. George K. Burgess, the director, declared that the regrouping is, in fact, a recognition of the importance of standardization in the commercial world. This portion of the bureau's work has grown with astonishing rapidity during the last few years. The first of the two main groups into which the bureau activities will be divided will be under the immediate supervision of Doctor Briggs and will include all the bureau's scientific research and testing, the development, construction, custody and maintenance of reference and work-

ing standards and their intercomparison, improvement and application in science, engineering, industry and commerce.

The second group, headed by Mr. Hudson, chief of the Division of Simplified Practice, will include the supervision, direction, formulation and coordination of commercial standards, with particular reference to the needs of industry, involving oversight of the Division of Simplified Practice, as in the past, and part of the work of the Division of Building and Housing relating to codes and standards. In addition, the correlation of the work of the Federal Specifications Board with commercial practice, and liaison duties with other branches of the Department of Commerce and with other departments in questions regarding commercial standards, will be included in this group.

Doctor Briggs will act as executive head of the bureau when the director is absent, in the management and supervision of the administrative, scientific and technical work of the bureau. He will also continue to act as liaison officer on matters of aeronautics between the bureau and other branches of the Government.

Hudson Valley Furnace Soon to Blow Out

The Hudson Valley Coke & Products Corporation will blow out its furnace at Troy, N. Y., some time this month, after accumulating sufficient iron to take care of its business during the period in which the furnace is to be out of blast. The coke, which the furnace ordinarily takes from the corporation's by-product oven plant, will go toward filling pressing orders for domestic fuel during the winter months. It is planned to blow the furnace in when the demand for domestic coke decreases toward the end of the winter.

Average weekly earnings in representative factories in New York State are reported by the State Industrial Commissioner at \$29.29 for August. This is the highest August figure on record and, except for six months through last fall and winter, is the highest figure for any month. It compares with \$28.95 in July and with the maximum of \$29.78 last March.

All-Metal Airplane Fuselages

Constructed of Alloy Steel by the Army, of Plain
Carbon Steel by Stinson, and of
Duralumin by Ford

MANY details about the production of aircraft fuselages were given at a technical session of the American Welding Society, Detroit, Sept. 20. Formal addresses were given by J. B. Johnson, of McCook Field, Dayton, Ohio, who described the construction of army aircraft, and by W. C. Maylor, chief engineer, Stinson Aircraft Co., Detroit, who told how his company builds commercial planes such as the "Pride of Detroit," famed for its America-to-Japan tour. Much of the specialized information reported

vertical pillars to which jaw clamps are attached by universal joints so as to permit easy removal of the completed skeleton. Stinson fuselages are made in jigs of angle iron, bolted together, the tubing passing through saddles made of split pipe and held down during erection by U-bolts. It is usual to start welding from one end, assembling and welding all the cross members as they are encountered. In this way expansion is controlled and Mr. Johnson seldom finds more than 1/16 in. eccentricity in a 30-ft. Army plane. Mr.



At Left—Fuselage Skeleton Made by Stinson Aircraft Co. of Thin Walled Carbon Steel Tubing Attracted Much Attention at Exhibit of American Welding Society in Detroit

Below—Close-up of Panel Point and Fish-Mouth Tension Splice in Lower Longerons of Army Airplane, Loaded for Test Purposes. Tension rod diagonals are now usually a tube welded into the joint

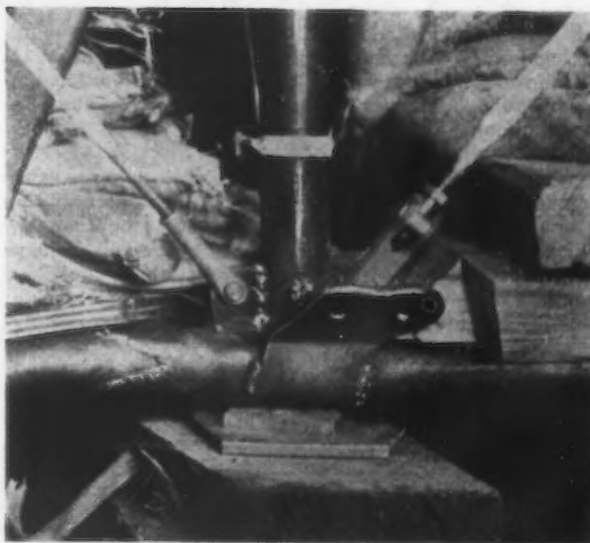
below may best be read in the light of the more general article on "Commercial Aeronautics and Steel" by William P. MacCracken, Jr., in *THE IRON AGE*, April 7, 1927, page 987. To those attending the meeting, a more vivid impression was made by a trip to the Ford Airport.

Army Uses Alloy Steel Tubing

According to Mr. Johnson, small air craft may have fuselages built of low strength carbon steel tubing, because while a lighter alloy steel design would be strong, it would not be stiff enough for service. In the larger machines, saving weight becomes more important, consequently the trend is away from hard drawn tubing to a chromium-molybdenum alloy. On account of its air hardening properties the strength of the alloy in the reheated zone near the joint is not much affected, (as indicated in the accompanying table showing average of many tests on various sizes and thicknesses of tubing). The Army has experienced less difficulty in getting uniform materials in the alloy steel than in carbon steels, especially during recent years.

Oxy-acetylene welding has done much to simplify the construction. The picture of the Stinson fuselage indicates that it consists of four trusses made of tubular members welded at the ends; tension members of wire shown in the close-up detail are becoming obsolete. Added weight of rigid tension members is less objectionable than the continuous necessity of adjusting the tension in wire ties. Controls are being made with "push-pull" rods operating through graphite bushings. Wall thicknesses are limited to 0.035 in. minimum in the main members by the Air Service, although even lighter ones are used in ribs for control surfaces.

Jigs for assembling Army planes are made with



Maylor said that 48-ft. longerons which would normally move 3/8 in. during welding could be kept to within 1/8 in. by proper clamps in the jigs.

Welding of High Strength Aluminum Alloys

At present only the largest wing skeletons are of welded steel; aluminum alloys are often found in smaller ones since it gives a better weight-strength relation. Unfortunately strong aluminum alloys cannot be welded without loss of desirable properties at the joint. Composite designs have been made by the Army

where a steel fitting encircles a duralumin member, and struts are then welded to outstanding lugs or ears on the fitting. On this point, however, discussion by Ernest Lunn, electrical engineer, Pullman Car & Mfg. Corporation, Pullman, Ill., A. G. Bissell, general engineer, Westinghouse Electric & Mfg. Co., and C. F. Nagel, assistant technical director, Aluminum Co. of America, New Kensington, Pa., brought out that considerable progress is being made in welding heat treated alloys by both resistance spot welding and fusion welding.

In the latter processes a welding wire containing 5 per cent silicon is desirable; it melts somewhat lower than the pieces being joined, has a low contraction on solidification, and readily absorbs the temperature strains. If a minimum of heat is used in making the joint, the hot portions will get an air quench. A region $\frac{1}{2}$ to $\frac{5}{8}$ in. away gets an air annealing, and this is the weakest point. Seventy to 80 per cent of the ultimate strength of the metal may be developed. Gas tanks of 15 to 45 gal. capacity are made of corrugated sheet aluminum 0.042 to 0.049 in. thick by the Stinson company, weighing as little as 0.35 lb. per gal. of capacity. Joints are made by gas welding $\frac{3}{16}$ in. upstanding flanges.

Commercial Fuselage Made in 90 Man-Hours

Stinson Aircraft Co., according to its chief engineer, W. C. Maylor, uses plain carbon steel tubing, containing 0.20 to 0.30 per cent carbon for the fuselage and rudder skeletons. Landing gears, tail skids and motor mounts, however, are made of chromium-molybdenum tubing in order to provide the maximum strength to resist impact and vibration of motor, unbalanced propellers or improper valve setting. After welding, these portions are annealed to relieve internal strains. As an instance of how heat treated steel may be welded, Mr. Maylor cited the landing gear axle, which after machining was heated to 1650 deg. Fahr., quenched in water, and then drawn at 900 deg. Fahr., giving it a tensile strength of 150,000 lb. per sq. in. This axle is welded into the fabricated and heat treated landing gear, the joint being placed at a position where the stress is relatively low.

Construction of a skeleton is very easy. All that is necessary are a jig, a hacksaw and a grinder to fit the members together, and oxy-acetylene welding equipment to make the joints. It requires 50 to 75 man-hours for the fuselage; 18 to 20 more will make the rudder skeletons, elevators and stabilizers. The completed job weighs about 200 lb. H. C. Knerr, consulting engineer, Philadelphia, pointed out that square tubing is now commercially available and is easier to cut and assemble into closely fitting mitered joints. A square tube having the same distance across flats as the diameter of a round one of equal weight is both stronger and stiffer.

The half-tone shows a typical joint in a truss with tie rod tension members. The tubular members at the intersection are slotted to receive the gusset plate, which thereby transmits loads to the longerons without danger of collapsing the thin-walled tubing. A "fish-mouth" splice in the horizontal is also shown, a design whereby tension or compression loads are taken largely by shear at the joint.

Field Repairs

Flying Officer Luke of the Canadian Air Forces said that the adoption of all metal fuselage skeletons was introducing special problems as to repair. In the old days of wooden construction, an accident usually left nothing to repair; now a wreck is seldom so bad it cannot be rebuilt. Bent tubing can be cut out and re-

placed with straight sections; a crushed joint may be incased by a sheet metal piece, cut and bent to fit the original shape, wrapped around the joint and welded at all edges. This often must be done in the open with strong breeze blowing, and the welder will use a much larger flame than indoors, with a corresponding danger of overheating the metal.

Fumes from the outside paint and the linseed oil on the inside of the tubing also add to the difficulties. He believes that if the tube were hermetically sealed internal corrosion would be impossible. J. B. Johnson said that such sealing is impossible; aircraft examined after service on the Pacific Coast was found to have sea water inside the tubing, and as a result the members were corroded and embrittled. W. C. Maylor also said that rust is the worst enemy of welded joints. He finds that an iron oxide primer followed by spar varnish containing aluminum powder pigment will give satisfactory external protection for $1\frac{1}{2}$ to 2 years. Since that is the maximum life of the fabric covering, the skeleton will be exposed for repainting at correct intervals.

Repair welding over brazed or soldered joints should of course be prohibited. Tests at McCook Field also indicate that rewelding over a sound welded joint will weaken it to 60 per cent of its original strength.

Significant of the times was the fact that one of the most heavily attended plant visitations of National Metal Week was to the Ford Airport, which included the opportunity of taking a hop over Detroit in a Stout all-metal airplane. In the hangar located at one side of the superb $1\frac{1}{2}$ by $\frac{1}{2}$ mile flying field, the mail and express planes used in the Ford Detroit-Buffalo-Cleveland-Chicago routes were inspected. A center of interest was the Fokker tri-motored plane used by Commander Byrd in his North Pole flight, now temporarily stored in the Ford hangars.

In the factory of the airplane division of the Ford Motor Co., next to the hangars, planes were seen in various stages of construction. This part of the Ford industries is not up to the traditional Ford standards of production, being still in the formative stage. One plane is turned out every six weeks. These large monoplanes are designed to carry 14 passengers or an equivalent load of mail or express, and are powered with three Wright whirlwind engines. There is dual control, the pilot and mechanic or second pilot are housed in a glass-windowed cockpit, forward.

Heat Treatment of Duralumin Members

The fuselage and wing spars of the planes are of duralumin angle and channel sections, assembled by riveting. Wing surfaces and body are covered with thin corrugated duralumin sheet. All duralumin members, including the fuselage and spar sections, and the surfacing sheets which require forming are made from rolled strip. These strips are coiled, immersed in an electrically heated bath of molten nitrate for heat treatment, quenched, rinsed and immediately passed through straightening rolls, after which they are formed to the desired sections in rolls or under a press, and allowed to harden with age. Rivets are heat treated in the same bath, and driven while still plastic. Important highly stressed terminal members are made of steel drop forgings or sheet steel, welded or brazed and heat treated.

This method of construction is admittedly more costly than that using seamless alloy steel tubing, assembled by welding, now adopted by most aircraft manufacturers. Its continued use by Ford is due to the fact that the riveted type of construction was developed in the Stout planes before the advent of tubular steel construction, when welding was viewed with suspicion.

Effect of Oxy-Acetylene Welding on Tensile Properties of Seamless Steel Tubing

Chemical Composition:						
Carbon	0.11 to 0.15		0.23 to 0.29		0.28 to 0.35	
Manganese	0.30 to 0.60		0.30 to 0.60		0.30 to 0.60	
Chromium					0.90 to 1.00	
Molybdenum					0.15 to 0.25	
	Unwelded	Welded	Unwelded	Welded	Unwelded	Welded
Tensile strength, lb./sq. in.	54,000	44,000	60,000	56,000	98,000	96,000
Yield point, lb./sq. in.	34,000	22,000	38,000	35,000	75,000	72,000
Elongation in 2 in., per cent.	40	9*	25	8*	12	7*

*Low elongation due to change of section on account of welded seams.

Testing Engineers in Holland*

Impact, Elastic Limit, Fatigue, Magnetic Analysis and Welding Testing Problems Discussed—New Constitution for International Association

(Special Correspondence)

AMSTERDAM, HOLLAND, Sept. 14.—A paper on "Potential Measurements with Rustless Steel Test Pieces," by Dr. H. Staeger of Baden, Switzerland, opened the session on Wednesday morning, Sept. 14. The point was brought out in the discussion, by Doctor Benedicks, that the protecting oxide coating, which is supposed to be the basis of the non-rusting qualities of steels of that type, will not stand up in an alkaline bath, and hence the metal will be attacked.

More Study of Wear Essential

"Testing Wear of Materials," by M. Spindel of the Austrian Railways, Innsbruck, was then presented. He pointed out how little the ordinary tests for strength, elongation, etc., made on steel or other metals, reveal as to the resistance they have to wear, and said that this property would have to be studied by means of special machines constructed for the purpose. The resistance to wear of a material is not comparable to the capability of an oil to lubricate, but depends upon the surface condition of the rubbed parts, whether oil is used or not, the specific pressure applied, and more particularly the rate of travel of the parts in contact. The paper was discussed by several of the railroad officials present.

Prof. J. O. Roos, director of the Swedish Bureau of Standards, read a paper by A. Lundgren of the Swedish Government Testing Institute on "Testing Hardened Steel." It covered the experimental results on the behavior of tool steel for machine shop use. The test methods were given, with the effect of different processes of annealing, the influence of hardening and tempering methods; the promise was made that much valuable information should result from the investigations in the direction of selecting the right kinds of steel for tools and their treatment.

Some Recent Impact Tests

Professor Schminning of the Dresden Institute of Technology then read a paper on "Impact Testing on Ordinary and on Notched Bars." He showed a large number of slides illustrating the effect of the depth and shape of notches, the relation of the impact tests to the other, more common ones, for strength; and emphasized the necessity of standardizing the notched test piece, so that the results obtained might be comparable everywhere. The effect of the test speed, the temperatures involved and the preparation of the specimen were gone into.

A general discussion of the paper brought out the fact that much had still to be done before the real value of the impact test might become generally appreciated.

Resistance of Material to Repeated Stresses

Professor Rabozée of the Military Academy of Belgium brought the session to a conclusion with a paper on the "Influence of Heat and Mechanical Treatment upon the Resistance of Materials to Repeated Stresses." An excursion of all the members of the congress and their ladies was had in the afternoon to inspect the extensive harbor works at Ymuiden, on the coast, where locks were being built of larger size than those of the Panama Canal, though not as deep. The use of concrete piles for the foundations, and the enormous amount of reinforcement steel was highly impressive.

*In THE IRON AGE, Sept. 29, page 883, a report was published of several of the early features and papers of the International Congress for Testing Materials. In this issue some of the other important papers are briefly reviewed.

The morning session of Thursday, Sept. 15, was taken up by two highly interesting, but principally theoretical, lectures of great value. Prof. F. Koerber, director of the Kaiser Wilhelm Institut für Eisenforschung, at Düsseldorf, spoke on "The Problem of the Elastic Limit" for an hour and a half, giving the outline of theories and illustrating his points with many lantern slides. He discussed the conditions which are necessary before elongation will commence and the mechanism of the stretching itself, the upper and lower limits of the elastic limit and how these are affected by temperature, speed of test and other conditions. The effect of aging, the preparation of the sample were also gone into, and the probable future developments in research predicted.

This lecture, after a recess, was followed by one given by Dr. W. Rosenhain of the British Government Physical Laboratory on "The Plastic Deformation and Fracture of Metals." In this, a critical review of our present knowledge on the subject of plastic deformation was given, of the mechanism by which such deformation takes place, the way the changes of properties associated with deformation are brought about, and in general what is known on the mechanism of fracture. Flow of material comes about through slipping of one crystal on another, or in the crystal itself along cleavage planes. If, then, we eventually get to know more about the properties of the unit crystals in our materials, we shall have a definite scientific basis on which to build our testing program to learn the properties of the entire structures.

Fatigue of Metals Again Reviewed

In the afternoon session, the paper of Prof. H. F. Moore, University of Illinois, Urbana, on "The Fatigue of Metals," was read by T. D. Lynch. This was a study of changing concepts of stress, strain and strength. While formerly it was supposed that under repeated stress the structure of some metals changed from what appeared a fibrous structure to one that was crystalline, modern investigation has shown that no crystallization occurred, but rather a slip along intracrystalline planes, and that fatigue failure consisted in a spreading crack which was thought of as starting from a surface of slip. It is probable that there is a limiting stress below which no destructive fatigue cracks will form, even under an indefinite and infinitely large number of cycle of stresses.

Prof. A. E. White, University of Michigan, Ann Arbor, next read the paper of Dr. D. J. McAdam, Jr., of Annapolis, on "Fatigue and Corrosion-Fatigue of Metals." This proved an elaborate array of tables and figures of fatigue results in combination with corrosion data, and should be studied by power engineers when the paper is eventually published.

Similarly the paper on "Tests and Properties of Metals at High Temperatures," by Prof. A. E. White, which was read later by the author, gave valuable information on this subject, for use by the boiler engineer who desires to use very high pressures and temperatures. In the paper, Professor White brings out the value of the high-chrome steels for this work, but their comparatively high cost prevents general adoption, except for smaller parts, a steel with 1.55 per cent manganese seemingly answering very well and being commercially available for the bulk of construction.

A long paper on "Tests in Connection with Specifications for Steel Rails," by L. Toutain of the Chemin de

fer du Nord, was next read. It was profusely illustrated by lantern slides and can be studied by those interested when published later.

Views on Heat-Resisting Alloys

Then came a very interesting paper by Dr. W. Rohn, who gave a number of data on "Heat-Resisting Alloys for Use in Annealing Boxes, Furnace Elements, etc." He stated that elements of this kind now had to serve for 25-ton furnaces, operated at 2000 deg. Fahr. for periods from 2 to 5 yr., without failure. As one of the best alloys he gave one with iron 17, nickel 50 and chrome 33 per cent. A paper was then presented on "Contributions to the Study of Effects of Viscosity Under Heat, and the Application to Various Metals and Alloys." This paper was by Jean Cournot and Andre Michel. Professor White then closed the session by reading his paper, as previously stated.

A soirée artistique was tendered the congress participants in the concert hall of the city for the evening's entertainment.

Friday, Sept. 16, M. A. Grossman of the United Alloy Steel Corporation, Canton, Ohio, read a paper on "Durability of Nickel-Chromium Resistor Materials," prepared by F. E. Brash and J. W. Harsch, and covering the work being done by a committee of the A. S. T. M. on the subject. This work is being done to obtain an accelerated test which will demonstrate the quality of these materials with results comparable to actual service. Three classes of resistor materials were discussed. First, the platinum group, which do not oxidize. Next, the nickel-chrome group, in which an oxide skin is formed and acts as a protector. Finally, other metals which oxidize but are satisfactory if used in a non-oxidizing atmosphere.

Developments in Magnetic Testing

Mr. Grossman then read another paper, by A. V. De Forest, American Chain Co., Bridgeport, Conn., on the "Use and Development of Magnetic Analysis in the United States." Moving pictures were shown of the actual testing of steel pins with the picture of the curves flashed before the operator. This enables him to reject all the faulty pieces.

Inclusions in Steel Discussed

Dr. Karl Benedicks then presented a paper written by himself and H. Lofquist, Stockholm, on "Our Present Knowledge Regarding Non-Metallic Inclusions in Iron and Steel." He began with a general description of occurring inclusions, and a study of their equilibrium diagrams. Referring to Hibbard's designation of the unavoidable inclusions carried along during the process as "sonims," Doctor Benedicks proposes the designation "Sonex" for the inclusions picked up from without the actual processing. This was objected to in the discussion that followed, as adding unnecessarily to the already large stock of bad English in metallurgy.

Next Professor Benedicks discussed methods of analysis of slag grains, the different factor influencing the appearance of the slag grains and their distribution in the metal, the influence of the slag grains on the material, the comparison between the amount of inclusions in different kinds of steel, and finally by what means these inclusions can be reduced. The importance of the subject brought out much discussion.

Professor Piwowarsky had sent in a paper on "Comparative Wear Tests on Cast Irons of Various Phosphorus Content." This was read by Doctor Esser, and brought out the observation that the higher the phosphorus the worse the wear.

Papers on Electric and Autogenous Welding

Next came a series of papers on electrical and autogenous welding of steel. M. Fuechsel of Berlin gave a general discussion on the subject, and stated that the weld could be relied upon—if well made—to have about 80 per cent of the strength of the rest of the metal on tensile, and somewhat less on bending. Director A. Sonderegger of Zurich, in his paper on the "Status of the Art of Welding, Its Problems and Aims," urged the annealing of the welded construction wherever possible.

In the afternoon session, Dr. G. Welter read his

paper on the "Elasticity of Metals and Alloys," taking up more specifically the testing of chains. He was criticized in the discussion for not giving sufficient attention to the elastic limit, as he held that all chains are overstrained regularly, and the ultimate strength was what counted particularly.

A. L. Norbury of the British Cast Iron Research Association delivered a paper on "Tests for Cast Iron," and the present status of the test bar question. Next came Dr. G. Keockgyarto of Budapest on "Torsion Tests." This was extremely mathematical and full of tables.

New Machine for Testing Hardness

J. Pomey then described his "New Machine for Testing Hardness," giving all its advantages; after which Prof. H. Dustin read a paper by himself and D. Rosenthal on "A Rational Calculation of the Elements in Welded Constructions." The session was closed by a paper on the "Italian Railway Tests of Materials Under Their Specifications," by A. Steccanella.

How Testing Machines Should Be Calibrated

Saturday, Sept. 17, Professor Memmler of the German Government Testing Bureau delivered a lecture on the "Testing and Calibration of Testing Machines," going into the matter thoroughly. He described the very exact method in use at his establishment, and then showed illustrations of a number of the more common arrangements in general use for judging the accuracy of machines in commercial work.

A paper on "Temperature Measurements Made on the Test Piece During the Application of the Load" followed. Then L. Toutain, chief engineer of the French North Railway, gave a description of the "Tests Applied in the Purchase of Rails." This was discussed by Prof. P. Welikhow and P. Sakaharow of the Soviet Railway Systems.

Dr. K. Daeves of Düsseldorf concluded the work of the metals section of the congress by a paper on "The Evaluation and Utilization of Data Obtained from Quantity Testing." When a great number of test results of a given line are bunched together, it becomes possible to construct a curve giving the optimum strength values of the material, together with an acceptable toleration both ways, which information serves excellently for specification purposes. Also, the extreme ends of the curve show the range and percentage of what might be classed as the exceptional results. The paper was much discussed and differed with.

Committee Reports Constitution for New International Congress

The final plenary meeting of the congress was then held, and the committee reported a proposed constitution for the newly suggested International Association for Testing Materials. It developed during the congress that the great progress made since the last testing congress necessitated the formation of some body which would have charge of this kind of work. Hence the recommendation to form a "New International Association for Testing Materials," which recommendation was adopted by acclamation.

The several paragraphs were then read in three languages, and covered the usual details of such movements. It was especially noticeable, however, that all connection with specification work was disavowed. Further, the very low annual dues of \$1 in American money stamps the movement as one of loose connection, with no work other than preparation for congresses held at three or more year intervals.

The secretary is to be Prof. M. Ros of the Swiss Bureau of Tests, Zurich, and the next congress, to be held in 1930 or 1931, was fixed for Zurich, Switzerland. The congress then adjourned, with the banquet held at Schereningen, near the Hague, in the evening.

The sixth regular monthly meeting of the Wisconsin Gray Iron Research Group was held at the Republican House, Milwaukee, Wis., on Wednesday evening, Oct. 5. The speaker was R. S. MacPherran of the Allis-Chalmers Mfg. Co., who talked on cupola practice.

Limitations of Structural Welding

Cheaper If Steel Shipped from Mill to Job—Arc Welding
Best for Strengthening Bridges—Problems Con-
fronted by Railroad Car and Automobile Builders

THE last technical session of the Detroit meeting of the American Welding Society, occurring on Thursday afternoon, Sept. 22, was in many respects the most notable. Under the genial chairmanship of F. T. Llewellyn, American Bridge Co., New York, a number of impromptu contributions equal in importance to the formal papers were made from the floor.

Field Welding on Tall Buildings More Expensive

Joseph Matte, Jr., construction engineer for Albert Kahn, Inc., Detroit, read a paper entitled "Welding of Structural Steel," opening the session with an account of how he first used arc welding about ten years ago by making caps and bases for wrought iron pipe columns, and since then had found increasing opportunities to introduce it into regular designs, or to modify more conventional designs submitted to his company for bids. For some time welds were considered only where they would take small stress (as rings and shelves to support linings), where the stress was in compression (as extending steel columns or column reinforcements when adding a story to a building) or where waterproofing or smoothness was required (as for tankage of charging floors).

As the size of this work increased, the cost and time of completion entered into the problem; one open-hearth charging floor with 43,000 lin. ft. of joint was put in with countersunk and chipped rivets because the erector was unable to sublet the field welding at a price which would compare with the riveted work, nor get a guarantee of rapid completion of the work.

With such occurrences in mind, Mr. Matte formulated the working rule that in the present state of the art field welding is more expensive than riveting. Some inherent advantage must overbalance the extra cost or its application is not justified. In line with this principle he cited swimming tank construction where the extra cost of water tight welded joints is more than

counterbalanced by a saving in waterproofing and felt required to surround a riveted tank. Connections of new buildings to old ones alongside made by welding are certainly to be preferred, for such a joint merely requires the surface of the steel to be bared, and not a big hole punched in the wall to get at all sides of the new joint, which extensive damage not only interferes with the utility of the old building but must subsequently be repaired.

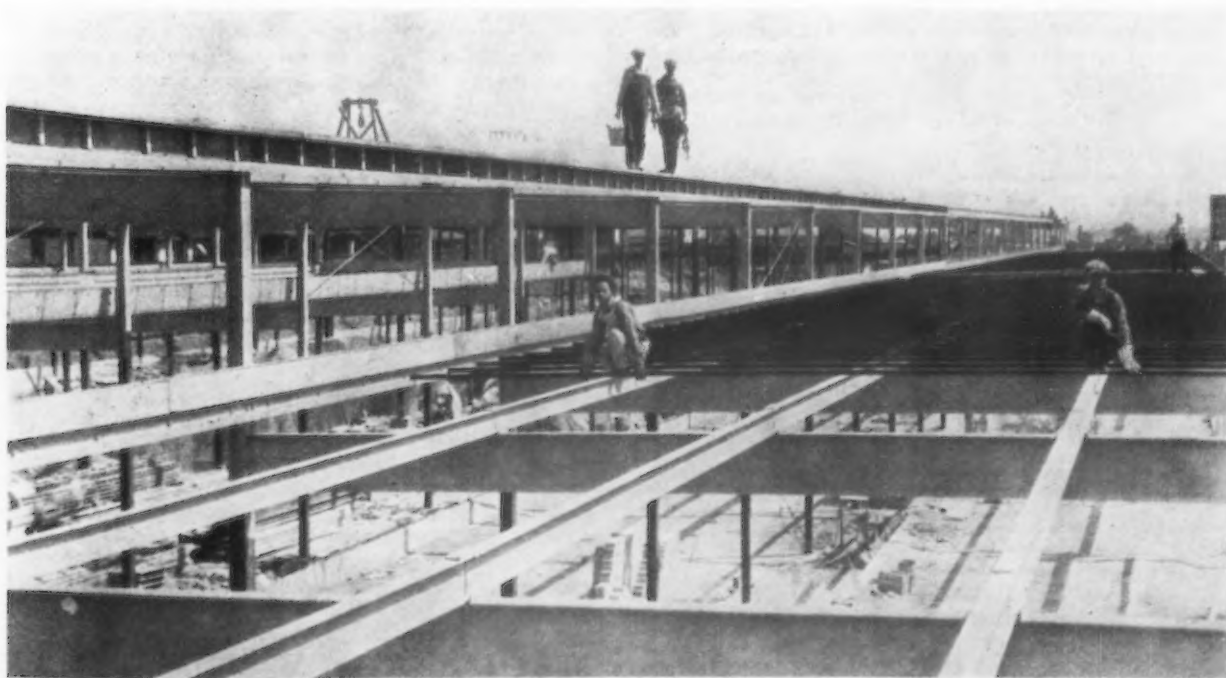
Furthermore, Mr. Matte proposed that wind stresses in tall buildings, which are usually absorbed by special end connections designed for exceptional stiffness, could be more economically handled by fixing the ends of the beams to the columns by welding. Competing designs are shown in the figure, and the welded design is cheaper when the welding costs \$1.50 per ft. or less.

Tests of Welded Wind Bracing

Such building connections require approval of city inspectors. To bring about acceptance of such welded details a number of conferences were held in Detroit between representative welders, steel fabricators, architects, engineers and the municipal departments of buildings and safety engineering. In order to determine the proficiency of the workmen and equipment which would be used in welded details erected in Detroit, three shops made test pieces as shown in one of the illustrations. The small welds on one side of the central bar were so proportioned that failure occurred by pulling away from the latter. The results follow:

	Tensile Strength, Lb. per Sq. In.		
	Max.	Min.	Average
Shop 1.....	71,800	46,100	58,600
Shop 2.....	56,700	35,500	47,400
Shop 3.....	49,800	39,800	45,300

In order to check these test strengths against the strength of a composite joint, a series of specimen wind connections were welded and tested with the results as



Most of This Steel Was Shipped Direct From the Mill

given in the table. Failures at computed loads on the welds were at stresses far less than the small test pieces successfully carried.

After these tests had been accepted by the Detroit Department of Buildings, bids were taken on designs for a tall building, but none of the reliable welding companies would bid less than \$2 per foot of weld, which in this instance totaled \$8,000 more than the cost of riveted construction. Consequently the wind bracing was riveted. Mr. Matte figured a conventional loft building requiring 430 tons of steel, using the same unit prices, and finds that field joints made by riveting would cost \$2,325, and if welded \$6,860. For tall buildings he finds no inherent advantage of welding which would offset the added cost. In his view this situation will remain until specialized welding machines, much speedier than the present ones, are developed for structural steel.

Allowable Design Stresses

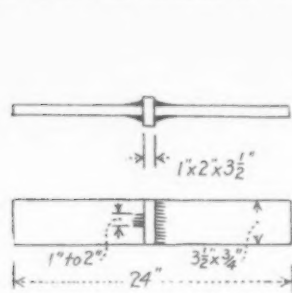
F. T. Llewellyn, chairman of the American Bureau of Welding's Committee on Structural Joints, told of the progress his committee was making in determining the safe unit stresses of weld metal in tension, com-

Any preliminary paint would be destroyed, at least in part, by the welding heat. Chairman Llewellyn said that rust on such faying surfaces was not a factor in ordinary structures—in fact the American Bridge Co. specifies that no painting shall be done before riveting, since that company has found it very difficult to drive rivets which will stay tight in members carrying vibrating loads if the overlapping parts have been previously painted.

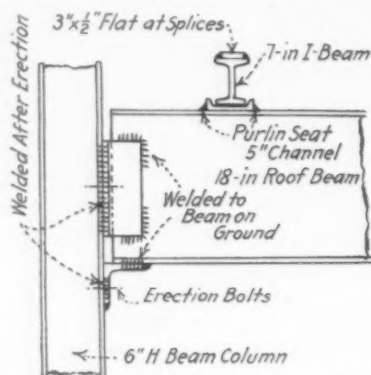
Economies in One-Story Mill Buildings

In the view of G. H. Danforth, contracting engineer, Jones & Laughlin Steel Corporation, set forth in his paper, "A Recent Addition to the List of Arc Welded Buildings," when structural material can be shipped direct from the mill to the job, avoiding the structural shop altogether, the economies more than offset the high cost of field welding found by Mr. Matte. Mr. Danforth described the erection of such a building, 150 x 460 ft. in floor area, for the Westinghouse High Voltage Insulator Co., Derry, Pa.

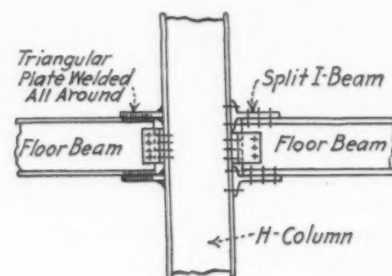
Of this building nothing much but the columns were sent through the fabricating shop. Roof beams and purlins were sent direct, cut to the usual mill variation



Test Piece Designed to Break Weld in Tension



Roof Construction of All-Welded Building at Derry, Pa.



Wind Bracing for Tall Office Buildings; Welded Design at Left Connection; Riveted Design at Right

pression and shear. An elaborate program had been mapped out and adequately financed; a study of existing data, and some pilot tests to determine the correct procedure have already been completed. The entire program, however, involved several thousand test pieces, and would require at least a year more to complete.

Rust in Welded Joints

A number of references having been made to "stitch" welding, where a short length of weld is expected to perform the duty of a rivet, C. S. Davis, consulting engineer, Pittsburgh, raised the point whether such proposed construction would be effective in excluding moisture and corroding influences from the lapped surfaces.

of 3/8 in. plus or minus. Alternate bays on this building have high and low roof (which is flat) so the horizontal roof beams meet opposite sides of the columns at different elevations. Holes were punched in the column flanges to receive bolts through clip angles welded to the roof beams. All connections to these beams were welded on the ground, after being properly set by a suitable template. Eye-beam purlins rest in short channel bearings, all as shown in the sketch.

Three welding crews were engaged. They started fabricating the roof beams two weeks before erection commenced, and did not complete the ground work until about one-quarter of the tonnage had been erected. The welding at the joints ("field welding") caught up to the erectors by the time the work was finished. No scaffolding was used.

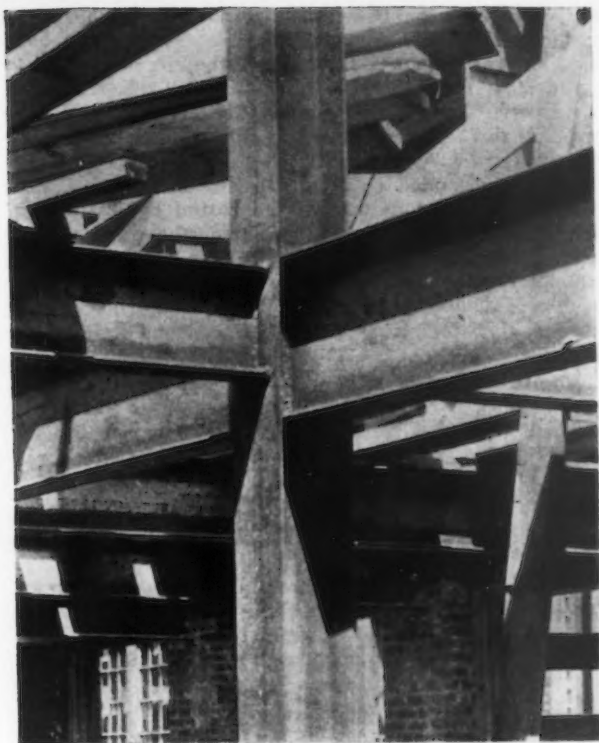
From an erector's standpoint, Mr. Danforth said the anchor bolts were ample to give the building stability, but that more guys were used to keep the structure plumb. He also commented on the close and uniform fit between columns and roof beams.

The following costs are interesting.

	Welding on Ground	Welding on Structure
Total time, man-hours.....	454	833
Total cost.....	\$917	\$1,683
Linear ft. of 3/8 in. fillet welds.....	1000	1500
Cost per ft.....	\$0.92	\$1.22
Rate per hr. (ft.).....	2.2	1.8

Costs per Ton Were as Follows:		
	Cost per Ton	Total Cost
Material, 337 Tons		
Steel.....	\$38.32	
Drawings.....	1.80	
Shop fabrication.....	3.60	
Freight.....	2.28	
Total material.....	\$46.00	\$15,500
Erection		
Overhead, freight and setting up equipment.....	\$6.80	
Unloading and distributing.....	1.60	
Placing.....	3.85	
Painting.....	3.15	
Total erection.....	\$15.40	5,200
Welding.....	7.70	2,600
Total cost.....	\$69.10	\$23,300

Tests on Welded Wind Bracing			
Tension on Weld, Lb.	Area of Weld, Sq. In.	Stress on Weld, Lb. per Sq. In.	Remarks
14-In. H Columns and 24-In. I Beams			
243,500	14.5	16,800	Weld failed at column
291,000	14.5	20,000	Weld failed at column
355,000	14.5	24,500	No weld failure
337,500	14.5	23,250	No weld failure
325,000	14.5	22,400	No weld failure
356,000	14.5	24,500	No weld failure
348,000	14.5	24,000	No weld failure
159,000	14.5	11,000	Weld failed at column
240,000	14.5	16,550	Weld failed at column
10-In. H Columns and 18-In. I Beams			
182,600	10.25	17,800	Weld failed at column
219,000	10.25	21,350	Weld failed at beam
168,000	10.25	16,400	Weld failed at column
223,000	10.25	22,700	No weld failure
214,000	10.25	20,850	Weld failed at column
235,000	10.25	22,900	No weld failure
225,000	10.25	21,950	Weld failed at column
209,000	10.25	20,350	Weld failed at column
131,000	10.25	12,800	Weld failed at column
8-In. H Columns and 12-In. I Beams			
113,500	6.75	16,800	Weld failed at column
119,000	6.75	17,650	Weld failed at column
132,000	6.75	19,500	Weld failed at beam
135,000	6.75	20,000	Weld failed at beam
142,000	6.75	21,000	Weld failed at beam
106,600	6.75	15,700	Weld failed at beam
146,000	6.75	21,600	Weld failed at column
151,000	6.75	22,400	Weld failed at column
137,500	6.75	20,350	Weld failed at beam



Column and Beam Intersection Made and Erected By Millwright Gang

Since the contract price was \$26,500, a profit of \$10 per ton was enjoyed. If the entire steel had gone through the shop and been erected in the conventional manner, Mr. Danforth estimates that the cost per ton would have been \$12.90 more than the building as erected.

Plant Extensions and Repairs

In discussing Mr. Danforth's paper, J. E. Webster, works engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., said that he had found it convenient to train about one-third of his millwright gang in the welding school. They were then able to do all kinds of carpentering, erecting and structural steel work without calling upon the services of several different trades. Additions and alterations to steel structures were made with erection drawings showing mill lengths, sizes of beams and working dimensions. Any cutting, trimming or bolt hole punching caused by skew connections or dislocations in previous structures would be made with a cutting torch, and all joints then made with arc welding. He showed slides of a two-bay foundry extension, an elevator pent house placed on the office roof, and a third story laboratory addition made in this way.

13 Per Cent Saved When Double-decking Havre-de-Grace Bridge

As an instance of the great utility of welding when modernizing or increasing the strength of steel bridges, W. C. Hopkins, bridge engineer, Maryland Highway Commission, described "Double-decking the 3300-ft. Bridge at Havre-de-Grace." This structure had been used by the Pennsylvania Railroad from 1878 to 1904, but since then as a highway bridge. Automobile traffic has grown to the point where 300,000 vehicles per year are crossing, for which the 13-ft. roadway is inadequate. Since the trusses are 35 ft. high, it appeared best to double-deck the bridge by putting in a new floor for north-bound traffic, midway between the upper and lower chords.

The old trusses are of wrought iron throughout, the compression members being tubular Phoenix columns. It was planned to bolt new cross beams to these columns, but after the contract was let, the erector offered an alternative design at the same price per pound whereby the columns were to be slotted to receive gusset plates, welded in place. New floor beams could then be connected to these gusset plates either by riveting or welding. Some 300,000 lb. of steel were saved by the adoption of this new proposal.

Gussets were also inserted and welded into the

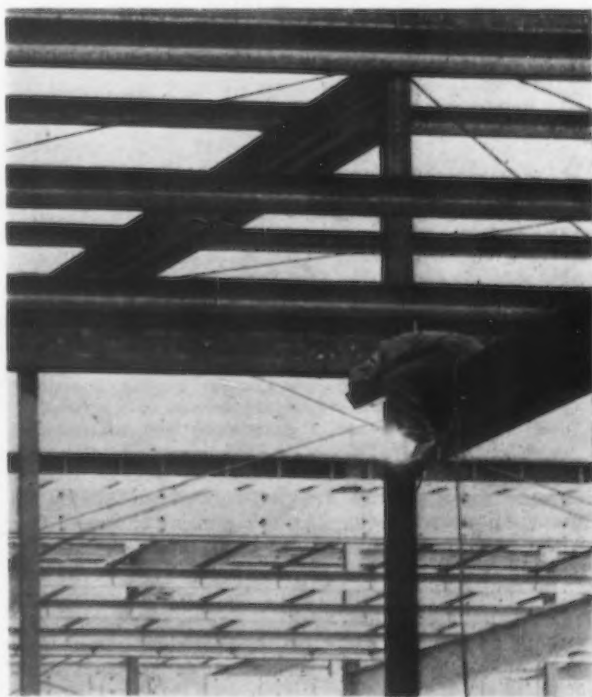
upper panel points to give lateral stiffness to the bridge, replacing sway bracing removed to clear the upper roadway. New struts in the top chord were also welded at all intersections. Two million pounds of steel were erected in three months, without interrupting traffic.

Welding for Railroad Car Builders

HOW the railroad car builder looks upon welding as a construction process was made clear at the Wednesday morning technical session of the American Welding Society at the Book-Cadillac Hotel in Detroit by Victor Willoughby, general mechanical engineer, American Car and Foundry Co., in a paper entitled "Car Welding."

The railroad man, according to Mr. Willoughby, who may seem to be slow in adopting methods proved satisfactory in general industry, is influenced by his natural caution and the overwhelming desire to play safe. A long list of welding applications are now not permitted by the code of rules governing repairs of freight and passenger cars of the American Railway Association and the speaker elaborated to some extent on the reasons and fears which have prompted this action. As a contrast Mr. Willoughby explained the advantages of welded construction for railway freight cars and described the construction of one car of this kind which was in a lot of 50-ton gondolas built for the Burlington. Welding saved about 500 lb. of material over riveted construction. This saving is significant not so much in reducing the first cost of the material but rather decreasing the deadweight hauled by the railroad. Other advantages may be cited such as eliminating projecting rivet heads and overlap at joints, and the ease with which, by welding, joints can be made water tight against weather.

Mr. Willoughby's paper was discussed by Ernest Lunn, Pullman Co., Chicago, S. W. Miller, Union Carbide & Carbon Research Laboratories, Inc., New York, and several others. Mr. Miller pointed out the fact that some of the fears held by railroad men with regard to car construction were based on incomplete knowledge and upon experience dating back to the time when welding by all processes was not developed to the present point. He stressed the importance of "procedure control welding" for both construction and repair, stating that in no instance where proper procedure had been completely followed has there been any failure whatever in welded joints. Procedure control, according to Mr. Miller, involves proper testing of operators, selection of material to be welded, design of the welded joint with regard not only to proper welded construction but also to the stresses expected in the joint.



Making a Joint Aloft Without Scaffolding

in service, application of correct welding technique and suitable testing of the finished weld upon completion.

Production Welding on Studebaker Cars

The second paper, entitled "Automobile Welding," presented at this session was offered by W. C. Happ, chief engineer, Department of Methods and Standards, Studebaker Corporation, South Bend, Ind. It would be impracticable, said Mr. Happ, to build an automobile as we know it today without the use of welding in some or all of its various phases.

He explained at considerable length the methods used for selecting and training welders at the South Bend plant. A school is operated which has trained about 500 operators during the last year. Mr. Happ attributed a considerable measure of the success achieved by the Studebaker Corporation to its supervisors of welding. Part of their duties consist in checking the proper tip size and oxygen pressures for oxy-acetylene welders and correct voltage and amperage

for operators working with the metal arc. Floor supervisors are also charged with the responsibility of seeing that inspection is rigid and complete.

In standardizing procedure at the Studebaker plant the welding rods have been very carefully considered. Welding rod is tested under standard conditions by making welds in 11-gage sheets; they are ground to sheet thickness and pulled in a tensile testing machine. Other qualities of the welding rod are tested by examining the rod under the blow-pipe flame and, for copper coated rods, by setting them up in a copper plating tank, reversing the process, and deplating the rods. Such a test, according to Mr. Happ, will bring to the surface slag inclusions and other obvious defects in the rods.

Another important step in the welding procedure explained by Mr. Happ was the methods used in testing finished welds. Several of these methods are unique with Studebaker and all of them give satisfactory results.

Sales and Merchandising Conference in Chicago, Oct. 20

A sales and merchandising conference of the Direct Mail Advertising Association is to be held at the Stevens Hotel, Chicago, Oct. 19, 20 and 21. The industrial sectional meeting will be Thursday afternoon, Oct. 20. The meeting will be presided over by S. Bowles King, advertising manager Sullivan Machinery Co., Chicago, who is a former president of the Engineering Advertisers' Association of Chicago.

The speakers and their subjects include the following: "How We Hook Up Direct Mail and Business Paper Advertising," by J. L. Ashcroft, Ludlow-Saylor Wire Co., St. Louis; "How to Capitalize Your Trade-mark," Dudley M. Diggs, International General Electric Co., Schenectady, N. Y.

Institute of Steel Construction to Meet

Program for the annual convention of the American Institute of Steel Construction, which is to meet Oct. 25 to 29 at the Carolina Hotel, Pinehurst, N. C., is tentatively announced. Among the papers are the following:

Proper Merchandising of Structural Steel, in the form of a report by the committee on better selling methods, by Karl E. Vogel, vice-president Omaha Steel Works, Omaha, Neb.

Fire-Proofing Structural Steel, by Rudolph P. Miller, consulting engineer, New York.

Tensile Working Stress of Rivets, by C. R. Young, professor of structural engineering, University of Toronto.

Greater Safety in Building Construction, by Robert D. Kohn, architect, New York.

Reinforced Concrete Construction, by Alfred E. Lindau, president American System of Reinforcing, Chicago.

Practical Tests of Windbracing, by Prof. Clyde T. Morris, Ohio State University, Columbus.

Steel in Residences, by Robert Tappan, architect, Forest Hills, N. Y.

Pricing Structural Steel, by W. R. Basset, of Miller, Franklin, Basset & Co., New York.

Steel in Bridges, by Dr. Ralph Modjeski, consulting bridge engineer, New York.

Economic Height of Buildings, by W. C. Clark, economist S. W. Straus & Co., New York.

Structural Steel Industry and Its Future, a symposium to which all members are invited to contribute and which will occupy the morning and afternoon sessions of Oct. 28.

A motion picture on the evening of Oct. 26 will be shown by the American Bridge Co., and another by the Hanna Engineering Co. At the annual banquet, Oct. 27, the principal speakers will be Truman S. Morgan, president F. W. Dodge Corporation, New York, and O. H. Cheney, vice-president American Exchange-Irving Trust Co., New York.

A. M. Conneen, Jr., president Hedden Iron Construction Co., New York, will serve as toastmaster in charge of the get-together dinner and Hallowe'en party on Oct. 28.

A fireproofing specification has been prepared by Lee H. Miller, the Institute's chief engineer, and a committee selected by the institute.

New data for the Institute's Standard Handbook has been compiled. The handbook includes the standard specification for the design, fabrication and erection of structural steel, the code of standard practice, the fireproofing specification and allowable load tables.

Golden Gate Steel Treating Discuss Gears and Welding

The September meeting of the Golden Gate Chapter of the American Society for Steel Treating was held Sept. 14, with Vice-Chairman S. C. Alexander in the chair.

The first paper of the evening was on "Gears, Their Manufacture and Heat Treatment," by F. A. Brooks, engineer Johnson Gear Co. He handled his subject from the standpoint of economics, engineering, manufacturing and heat treating.

The second paper, "Welds and Welding," by W. F. Barron of the Linde Air Products Co., was intended to indicate the proper kind of weld—single, double vee and butt, etc. It was also stressed that certain kinds of welding rods were superior to others.

New Minerals Division in Department of Commerce

WASHINGTON, Oct. 4.—Organization in the Bureau of Foreign and Domestic Commerce of a Minerals Division, which will supplement and assist in the work of the Economic Branch of the Bureau of Mines, has been completed as the first step in connection with the work of the Department of Commerce in surveying and coordinating its activities in the field of minerals and metals. The new division, the nucleus of which is the former Minerals Section of the Iron and Steel Division, will deal with minerals and metals, coal and petroleum, each in charge of a specialist. It is understood that Marshall W. Tutthill of New York will be put in charge of the metals work.

Transmission Equipment Simplification Is Pending

The Division of Simplified Practice of the Department of Commerce, Washington, and the Leather Belting Club of Chicago have called for a simplification of transmission and belting equipment. Probably the activity will be centralized in the Power Transmission Association, W. S. Hays, secretary, Drexel Building, Philadelphia. Remarkable results have been accomplished in Germany, it is claimed, through the working out of a simplification plan in that country.

British Steel Men Present Views on Causes of American Steel Industry's Prosperity at Iron and Steel Institute

(Special Correspondence)

GLASGOW, SCOTLAND, Sept. 21.—About 300 members of the Iron and Steel Institute, including not only representatives from Great Britain, but also from the United States, Japan, France, Belgium, Spain, Germany and Poland, attended the meetings in Glasgow this week, which were held under the auspices of the West of Scotland Iron and Steel Institute.

John Craig, speaking on behalf of the West of Scotland Iron and Steel Institute, offered the visitors a cordial welcome. Frank W. Harbord,

president of the Iron and Steel Institute, in replying, said that was the fourth time they had enjoyed the hospitality of Glasgow, and it was 26 years since their last visit to the city. Within the city and neighborhood were some of the greatest steel and engineering works, and the Clyde was, of course, pre-eminent all over the world for its shipbuilding.

Mr. Harbord announced that Benjamin Talbot of the Cayo Fleet Iron Co., Ltd., Middlesbro, had been elected president for the coming year.

British Views of American Iron and Steel Industry

THE first paper presented was by Theodore W. Robinson, vice-president Illinois Steel Co., Chicago, who described some of the more important changes that have affected the manufacture of iron and steel in America.

[A liberal abstract of Mr. Robinson's paper was printed in *THE IRON AGE*, Sept. 22, pages 785 to 787.]

Benjamin Talbot, in opening the discussion, said that the paper was of great importance not only to a technical society like the institute but also to affiliated federations, especially those which had to deal with labor, because there were some profound principles involved which had been realized not by means of labor unions at all but by means of the open shop: in other words non-union labor. Everything, and more, that outside agitators, with whom they had had to contend for so many years, claimed could only be obtained through them, had been obtained by individual committees in direct communication with their companies and their works. That to his mind was one of the outstanding features of the paper.

The 12 and 8-Hr. Days

A point upon which he would like the author to give further information was the statement he made that until 1922 the plant was operated universally on 12-hr. continuous operation, but since that time the present 8 and 10-hr. working schedule had been adopted, and a 7-day week had been replaced by a 6-day week. It looked to him as if in that statement there had not been an automatic cutting down to 8 hr. all through, which was forced upon them just after the war rather hurriedly, to his mind. Probably if they had left it a little longer they would have had more to say about it.

There were certain operations which all agreed should be 8-hr. operations; there were others about which there was divided opinion; and something must have occurred in the industry in the States, because there were 8 and 10-hr. days adopted in the works.

He noticed that the author in taking out the figures for the return which capital had obtained had taken the whole country into consideration. He thought better results would have been obtained if the author had taken only the figures for his own corporation and the returns which they had obtained in the shape of profits and dividends.

The Americans, due to certain great causes, had obtained large advantages which would not have been possible under that conception of business, which was prevalent in the decade of 1890 to 1900, which was summed up in the phrase: "Each man for himself and the devil take the hindmost." The stabilization of prices which the Steel Corporation had brought about

had been, to his mind, a great advantage to the United States of America.

Sir William Larke (director National Federation of Iron and Steel Manufacturers) said he was sure the members were much indebted to the author for answering what to many people in England had been a wonderful riddle: How the United States had obtained the results which that country had enjoyed during a period when the experiences in England had been far different.

Individual Effort Versus Multiplied Individuals

Among the many telling phrases which the author had incorporated in his paper he desired to refer to two which he thought gave the complete answer. One was: "A vital factor in the development of the twentieth century, and one which has been especially emphasized in the United States since 1914, is the multiplication of individual effort rather than the effort of multiplied individuals." He hoped that phrase would be broadcast throughout the British Press and be pondered and considered in labor circles.

The author also stated: "The larger the output of the individual workman, the greater is the tendency to lower costs and the greater the possibilities of return in wages and in dividends." A great deal had been heard about the secret of high wages. In his opinion there was one secret of high wages and that was low costs. That was the whole solution of the problem of high earnings on the part of labor.

In a country such as the United Kingdom, which depended on its export trade for 50 per cent of its products, it was clear that costs must first of all be reduced in order that it might dispose of those products; and if they reduced their costs with the same income it was equally clear that they reduced the standard of commodity prices and increased the standard of living, a fact that was most frequently forgotten particularly in labor circles.

He was interested to note the enormous reduction which the Steel Corporation had experienced in the number of accidents. He was privileged to be in the Gary steel works in 1912 when the high percentage of accidents to which the author referred was then in operation, and he was amazed at the completeness at that date of the safety first arrangements and the educational campaign.

Combinations and European Opinion

He concluded with a few words on the subject of combinations. It was rather extraordinary that in the United States at present the view still lagged a little behind, judged from the paper, of the view held in

Europe. In the United States industry had led the combination movement. In Europe at present he thought it was safe to say that public opinion was leading the combination movement and industry was actually following it.

There was one fallacy with regard to the combination movement he never could understand, but it was frequently raised in this country, and he gathered from the author it was the cause of the anti-combination laws in the United States. It was that the consumer always considered that a combination in regard to the product which he consumed must operate against him.

He asked the consumer to consider whether those people who entered into combinations for the purpose of improving the efficiency of their industry were so unintelligent that by so doing they were likely to prejudice the consumer's interest on whom they depended for their prosperity? Could anything be more fallacious or unintelligible than to enter into a combination for the purpose of more rapidly committing suicide by destroying the outlet for one's products?

Quite clearly combinations were designed to improve the efficiency of the organization, and in so doing they benefited the consumers of the products which they produced. Therefore he trusted that combinations and organizations for improving the efficiency of production would not only receive, as they were receiving at the present time, the support but the stimulus and pressure of public opinion in this country, as it was only by means of higher organization that this country could hope to readjust itself to the post-war economic position.

American Labor Not Mixed With Politics

H. Rudolf Sunström (Stockholm) said the author stated in his paper that one of the great factors which had helped in obtaining the results produced in industry in the United States had been the cooperation among finance, management and labor. He had been in the United States and had been employed in one of the subsidiaries of the Steel Corporation, the American Steel & Wire Co. It seemed to him that one of the great reasons for the results obtained was that in the United States labor had not mingled politics and economics. In his opinion that was why America was not handicapped while Europe was.

Educating the Wage Earner

Francis Samuelson, past president, said that he happened to read the paper in the train, and he looked at the first page particularly to see whether it contained the words "confidential until after the meeting." When he saw that it did not, he carefully left it on his seat in the hope that it might fall into the hands of some working man, who would pass it on to his friends in order that they might have a talk about it. Very many wise things were said in the paper about increased production from the point of view of the producer, but it was extremely difficult to get those things said in the right way to the right people.

If it were only possible to get a paper like the author's into the hands of the working man without his knowing how he got it there, it might do an enormous amount of good. He was speaking at the moment as though it was only the working man that wanted teaching, but everyone present knew that they required teaching just as much as the working man, but it was not quite as hard to get at them.

The one outstanding fact that people on both sides of capital and industry did not always seem to remember is that wealth was really an accumulation of surpluses. It was only by producing a little more bread than was actually required to keep body and soul together that it was possible to expect people to have any means of getting a little butter and a little marmalade.

Prof. Henry Louis said the only sentence in the author's admirable paper which was not quite clear to him was where the author stated that the earnings for the years 1925 and 1926 were respectively 5.61 and 6.70 per cent on the capital invested. He hoped the author would be good enough to say whether that included interest and depreciation and reduction of

capital or not. Obviously in an industry with wasting assets, such as the mining industry in which he was so largely interested, that question was a very vital one.

Author's Literary Style Commended

Sir William Ellis, past president, desired in the first place to congratulate the author on a terseness of literary style which he thought was ahead of anything of the kind which had been read at the institute in a very long time. There were certain phrases in the paper which would last in England if they had the courage to air them in an audience in which they might not be very acceptable.

He did not know to what extent the author realized what the difficulties in England were in connection with industry and labor. He would like him to go away with the impression that, although its difficulties had been enormous, almost crippling to the country, there were already some indications that the spirit of political animosity and the desire not to advocate on all occasions peace in industry was to some extent passing away. The evidence in that respect recently forthcoming at the Trade Union Congress was encouraging; it was very different from what was heard a year ago.

John Craig said the author's paper would make the present meeting memorable. Some years ago he had a conversation with a member of the late Labor government in which he castigated him, as representing the employers, for his ignorant and non-enlightened attitude toward labor, suggesting that if employers wanted to learn something that would be useful to them in regard to the proper treatment of labor in this country, they should apply to America. He would ask the secretary for an extra copy of the paper to send to the member of the late Labor government as it contained the reply of America to the difficulties connected with labor that existed in Britain.

It might interest the author to know that, by means of the excess profits duty and a very largely increased income tax, the government made quite certain that iron and steel manufacturers were left with no more money at the end of the war than they had at the beginning. That fact was not sufficiently recognized in this country, and manufacturers were charged with lack of enterprise and development, but he was sure the statements he had made would be borne out by all those who were acquainted with the inner workings of the industry. Some things were left to the steel works, such as additional plant, but that plant had been the means of extracting further money from the industry owing to the fact of increased local taxation.

Wage Payments Yesterday and Today

Hon. Roland D. Kitson fully agreed with everything that had been said in admiration of the author's excellent paper and in particular of its pithy literary style. Arising out of the paper it struck him there were things today which the members would never do which were done by those who went before them. Take the case of a certain mill which made a special article. The method of payment was so much per shift. He did not pretend to say that he was quoting the actual figure, but it was near enough if he said that a reasonable output of the commodity per day was 400. By very hard work a team of men could produce 800 or possibly 900, but the extra rate of pay per 100 the men received was something like 6d.

Could the members imagine any man being such an idiot as to lose his shift money for one day, or two days in the week, in order to earn an extra 6d. per 100 in a hard day's work. It was almost incredible that anybody could have been so stupid as to have arranged such a scale on which to pay the men. He merely introduced the point with the object of saying that there was nobody present who would dream of making an arrangement with his men on those lines, nevertheless some 30 or 40 years ago there must have been several gentlemen in the room who were.

Economic Conditions Now Different

E. A. Atkins said there had not been much discussion about the possibility of the unification of the steel industries in this country. It was true that certain statements had been made that some works went

on in their own individual way at about half or quarter cock, and the question arose whether the time was not ripe for considering some way by means of which the various works could be joined up so that it would be possible to arrive at a condition in which steel was produced very much cheaper than it was at the present time.

Personally he had been wondering whether any of the members would be wise in advising their workmen to invest their very scanty savings in the iron and steel industry. If one looked over the price of shares at the present time it would be found that a good many of them were paying no dividends at all. That might not be a serious matter to anyone who had a thousand or two or three thousand shares, but it was a very serious matter to a workman who had perhaps saved up £250 to lose the whole of his income from that investment, or if he wanted to sell it get a largely reduced price for it. Those were facts which must be taken into account when statements of that kind were made. It must be borne in mind that in this country they had not yet arrived at that state in which the best cooperation in industry could be obtained.

Keynote: Cooperation Based on Confidence

The president said it seemed to him that the keynote of the paper could be summed up in the words: Cooperation based on confidence. In America the workman realized that if he did the work, he would get the pay. The employer realized that it was for him to find the capital to give the workman the machinery which would enable him to get a big individual output. That was only possible when there was absolute confidence that the man would do his part and that the master would do his part as well. Cooperation was then obtained between so-called capital and labor.

Mr. Robinson Replies

Theodore W. Robinson, in reply, said he offered his paper through the institute with some trepidation, but he then said to himself that he thought no one could object if he confined himself to facts and if he dared to offer a few conclusions as long as those conclusions appertained to the United States and not to this country. It might well be the case that among the facts there were some items of interest which were possible of application in England. As he had previously stated, it would be presumptuous on his part to make more than a suggestion along those lines.

Hours of Labor

Mr. Talbot had referred to the question of the hours of labor. Up to comparatively a few years ago the iron and steel industry in the United States was on a 12-hr. basis, two 12-hr. shifts, and on the seventh

day in the week 10 hr., so that there was a 12-hr. and a 10-hr. proposition. There were a relatively few 8-hr. propositions.

Partly from an economic state of affairs and partly due to the force of public opinion, the view gradually arose that a man ought to be able to earn a living wage and yet not work 12 hr. a day 7 days a week. Curiously enough when that was suggested, there was great opposition on the part of the men. However, the change was brought about, and America was now working upon an 8-hr. day system for continuous operations, and a 10-hr. day system in shops with non-continuous operations.

Reference has been made to the amount of the earnings on the capital invested. It would be noted that the percentage he had given was roughly $5\frac{1}{2}$ and $6\frac{1}{2}$ earned on the capital invested, which of course meant not on the capitalization of the concern but on the amount of capital that was invested. Of the 85 per cent of the country's ingot capacity referred to in the paper, nearly one-half was represented by the United States Steel Corporation. Nothing was concealed in the report of that corporation. Judge Gary made an alteration in the method of conducting business, so that all the cards were now on the table, and if the reports were consulted it would be found that, during the last few years, upon the amount of money that was invested in the United States Steel Corporation the earnings totalled about 6 per cent.

Steel Corporation's Dividends

It must be remembered that for many years the corporation did not pay any dividend on the common stock, and when it did pay a dividend it was only 5 per cent. But owing to the wisdom of the management, they were putting back money into the business all the time whenever they could do so consistently. It was earning the 6 per cent to which he had referred because for so many years it had been putting back into the industry money which could have been distributed.

He thanked the members cordially for the very kind reception they had given him, and he could only hope that collectively or individually they would visit America and see all that was to be seen. Everything was open to them. The American iron and steel manufacturers were always glad to see their English friends and to answer their questions. He was convinced that the British iron and steel manufacturers had better times in front of them, and it would not hurt anybody if there was closer cooperation between the wonderful organization that the institute represented and their colleagues in America.

[In a later issue reviews of some of the technical papers and discussions will appear.]

Changes in Machine Tool Production

Increase in Total in 1925 Accompanied by Decrease in Many Items—
Distribution by States

PRODUCTION of machine tools in 1925 is reported by the United States Census Bureau to have aggregated \$91,459,403. This is an increase of more than $1\frac{1}{2}$ per cent over the \$89,964,059 of 1923, the next preceding census year. This increase was not evenly distributed among the different tools. There was a sharp decrease in vertical boring mills, in multiple-spindle drilling machines and surface grinding machines, in lathes of all types, in planers (which were almost halved), in electrical and pneumatic drills and in shapers.

Tools which showed a considerable increase included horizontal boring machines, sensitive drills, gear-cutting machines, cylindrical grinding machines, internal grinders, universal milling machines, as well as those of the planer type, pipe-cutting and threading machines, portable electric grinders, hydraulic bending and forming presses, presses for sheet-metal work, punching machines, power shears and multiple-spindle screw machines.

Figures for the industry as a whole, including products other than machine tools, show for 1925 a total of \$175,592,488. To this may be added \$20,768,270 of metal-working machinery produced as secondary products in other industries, making a grand total of \$196,360,758.

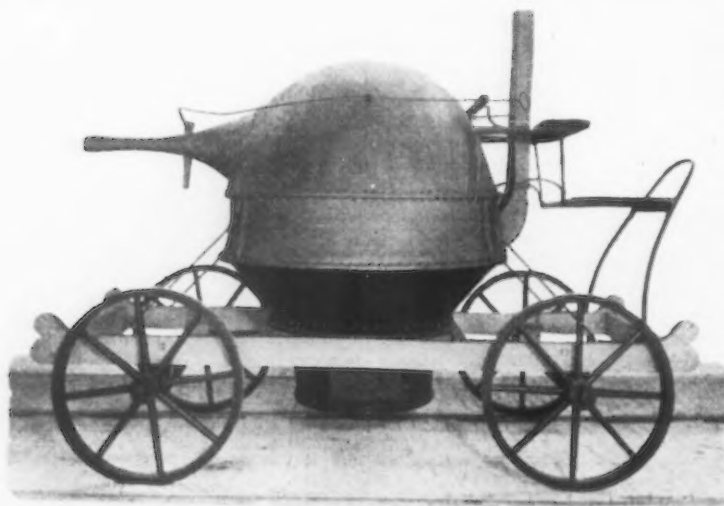
Ohio was the leading State, as has been the case for many years. Its production was about equal to that of the next three States in order, which were Pennsylvania, Massachusetts and Connecticut. Illinois, New York and Michigan were the only other States to pass \$5,000,000 in output of machine tools during 1925.

With an eye to increased output of sheet bars at its Farrell, Pa., works, the Carnegie Steel Co. will change the lineup of its 8-stand continuous mill by replacing two stands of 18-in. rolls with four stands of 24-in. rolls. The latter are to be furnished by the Treadwell Engineering Co., Easton, Pa.

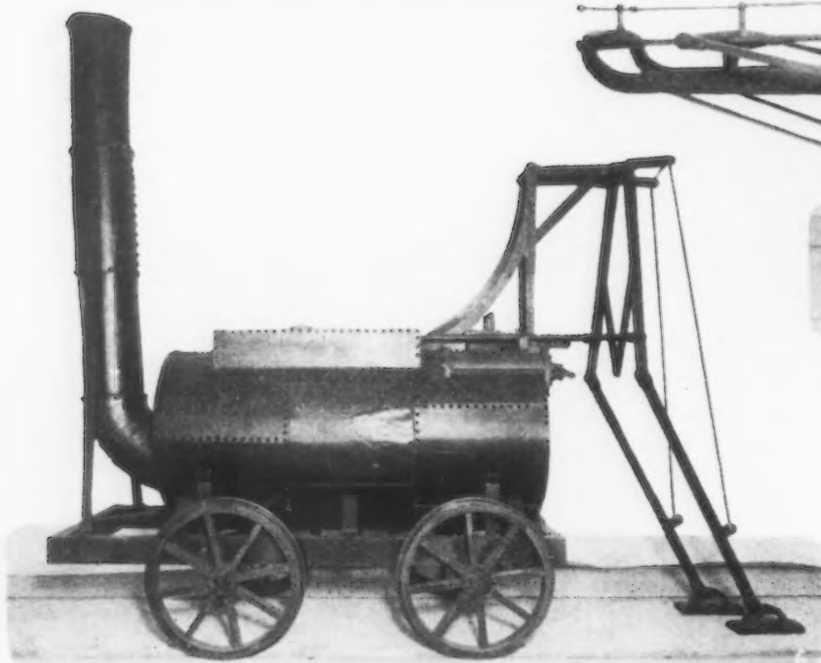
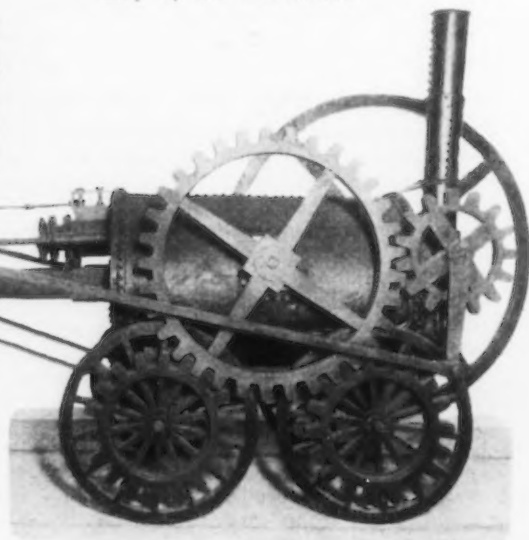
Development of the Locomotive

Celebration, at Baltimore this Month, of the

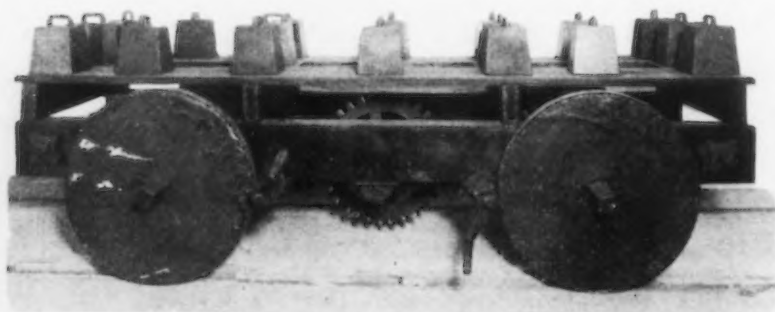
FIRST among the full-size models was that of Newton's Idea, put forward in 1680, of using steam to press with enough force through the nozzle upon the atmosphere to secure locomotion



IMMEDIATELY below is the Trevithick III, built in 1803 by Capt. Richard Trevithick, the first locomotive in the world to run on rails. It was operated on the South Wales tramway in England, but horse operation proved less expensive than upkeep of the locomotive



AT the left is the Brunton, or "horse leg locomotive," constructed in 1813. One of the long legs pushed the engine forward while the other leg was getting ready for action. Its slow speed of three miles per hour put it out of the running



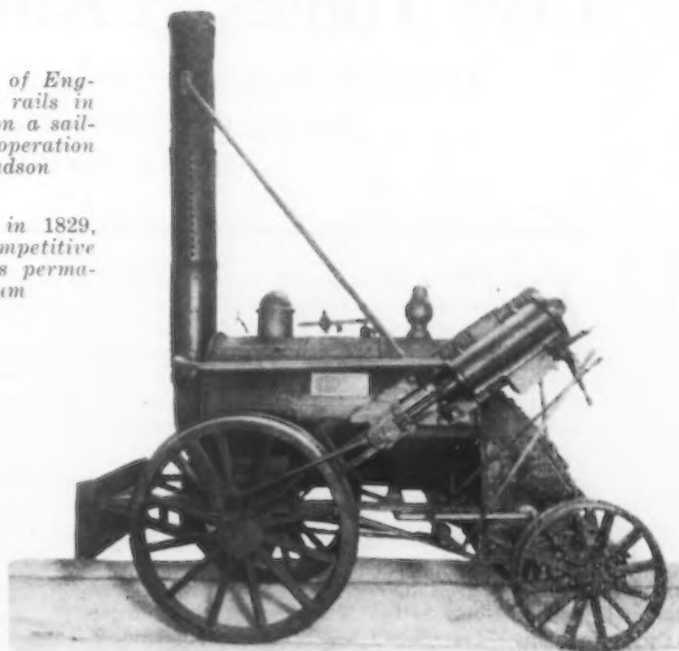
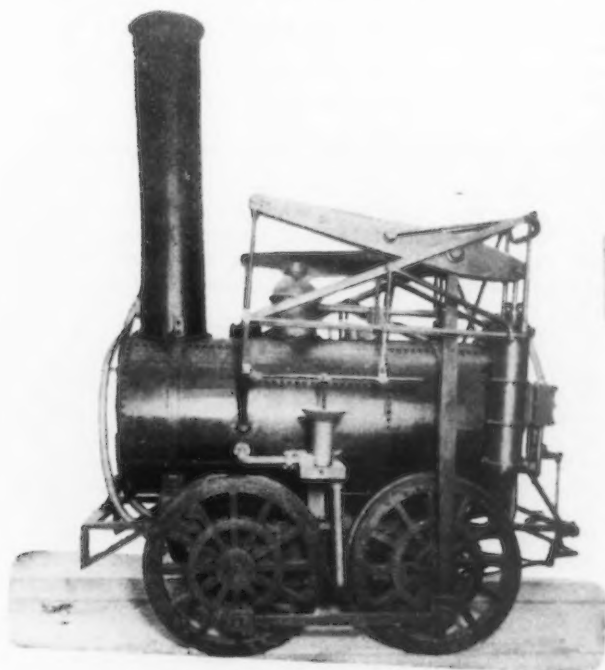
TO prove the adhesion of smooth wheels to smooth rails, Hedley's Model was built in 1813 and operated by manual power. One of the great questions was the amount of adhesion to the rails so cog rails and other devices need not be used. Hedley proved by his model that the weight of a locomotive furnished the necessary adhesion. Shortly afterward, in the same year, he designed and built the Puffing Billy, shown at the left. It has a blast fan and the return flue. As originally built, it depended upon the rail being flanged instead of the wheels. Preserved in the South Kensington Museum in London, it is the oldest existing locomotive in the world

Shown in Exhibition and Pageant

Centenary of the Baltimore & Ohio Railroad

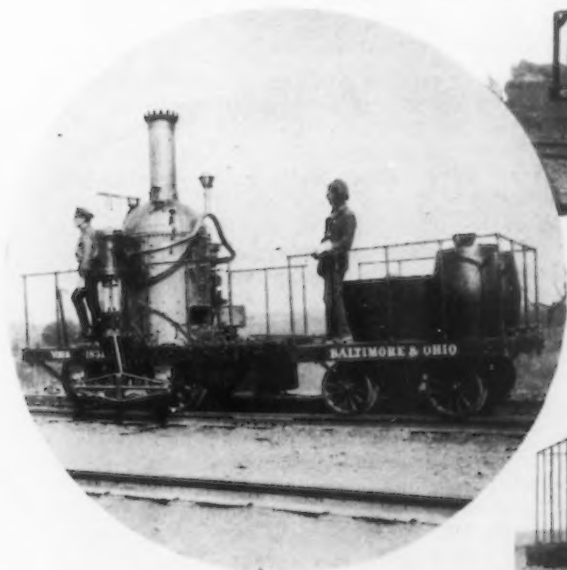
THE Stourbridge Lion (below) built by Foster, of England, in 1829, was the first engine to run on rails in America. The engine was shipped to New York on a sailing vessel and then taken to Honesdale, Pa., for operation on the Carbondale road, of the Delaware & Hudson

THE Rocket (at right), built by Stephenson in 1829, gained world-wide fame when it won the competitive locomotive trials held at Rainhill, England. It is permanently located in the South Kensington Museum



BELOW is shown a replica, moved under its own steam at the pageant, of the Tom Thumb, the first American-built locomotive. It was constructed by Peter Cooper, New York, in 1829. Mr. Cooper owned stock of the Baltimore & Ohio Railroad. With its horse-drawn cars it could not handle the freight and passenger business offered. Mr. Cooper obtained permission to try his little 3½-ton locomotive, demonstrating finally, in a run of 13 miles from Baltimore to Ellicott City, Md., that steam as a motive power could be substituted for animal power

THE York (below) was the first locomotive in actual service on the Baltimore & Ohio. It was built in 1831 by Phineas Davis, York, Pa. It hauled the "York Express," making a round trip of 28 miles in one hour



THE train at the right, moved at the pageant under its own steam, was the actual locomotive built in 1832 and in service until 1893. The coaches are reproductions of passenger cars built for the Baltimore & Ohio in 1831



Live Topics at Automotive Sessions

Unique Correlation of Data on Heat-Treated Alloy Steels— Honing Crankshaft Bearings and Cylinders— Inflammable Finishes and Fires

PROFITABLE and well attended technical sessions were held by the Society of Automotive Engineers at the annual production meetings both in Cleveland and Detroit. The Cleveland sessions took place on Sept. 19 and 20 and a brief review of some of the features of the sessions on Sept. 19 appeared in THE IRON AGE, Sept. 22, page 811. In the following columns there is presented a few of the papers delivered at the last meeting in Cleveland on Sept. 20 and at the sessions held on Sept. 21 and 22 at the Hotel Statler in Detroit. Most of the automotive engineers from Cleveland came over to Detroit on the evening of Sept. 20 to the number of about 100.

PAPERS on the external honing of crankshaft bearings and on developments in cylinder honing or grinding were presented at the third and last session of the production meeting of the Society of Automotive Engineers, held at the Hotel Winton, Cleveland, Sept. 19 and 20.

Honing of Crankshaft Bearings and Cylinders

THE paper on the honing of crankshaft bearings was by L. A. Becker, chief engineer, A. P. Schraner & Co., Cleveland. The development of a machine for the honing of these bearing surfaces was described and problems met with in the development work were outlined. The honed crankshaft was said to present bearing surfaces equal or superior to those of a hand-polished shaft that has been running for 1000 miles or more. Honing takes the initial wear from the bearings before the shaft is placed in the engine, this removal of the initial wear and the correction of the grinding errors being said to be the essential object of honing.

Honing and lapping were briefly compared, honing being termed "a modern method of lapping, using bonded abrasive blocks or stones instead of a metal block charged with abrasive." The honing machine was said to have proved suitable for correcting inaccuracies, as well as for production finishing. The action of the hone was analyzed and the elements that affect the process were discussed. The application of honing to other bearing surfaces is foreseen, and in this connection it was said that "it is entirely possible that we shall be able to assemble an engine with the initial wear eliminated from every moving part."

Cylinder Grinding Developments

"Developments in Cylinder Grinding," a paper by M. C. Hutto, Hutto Engineering Co., Detroit, was presented by G. C. Paye, chief engineer of the Hutto company. It was pointed out that the manufacture of more accurate pistons necessitated better cylinders. The research and development of grinding or honing methods to meet this need were described at length. The manufacture of abrasive units for honing or grinding of automobile cylinders was described briefly by P. H. Walker, ceramic engineer Carborundum Co., Niagara Falls, N. Y.

Electric Motors Applied to Machine Tools

A paper on the "Application of Electric Motors to Machine Tools" by R. C. Deale, electrical engineer of the Niles-Bement-Pond Co., New York, was presented by title. In this paper Mr. Deale notes the trouble and expense caused manufacturers and users of machine tools and other motor-driven machinery by the lack of uniformity in the mounting dimensions of the electric motors built by the different manufacturers. Comparison is made of some 13 makes of alternating current motor dimensions and also of d.c. motor dimensions. Attention is directed to the fact that a series of stand-

ard dimensions has been worked out to apply to the special motors used in steel mills for operating various auxiliaries and that the dimensions have been accepted by the manufacturers of these motors.

Incidental Fire Hazards

FIRE hazards, resulting from the use of inflammable finishes, may be greatly reduced, if not entirely eliminated, by such preventative measures as dilution of vapors by proper ventilation, good housekeeping, properly installed and maintained electrical devices, use of sprinkler systems and the strict absence of open flames in spraying departments. It was also pointed out in a paper entitled "Fire Hazards Incidental to the Spraying of Inflammable Finishes," which was read for H. E. Miner, E. I. du Pont de Nemours & Co., Wilmington, Del., at one of the Detroit sessions, that copper, with the exception of silver and one or two other metals, is one of the best catalytic agents. Spirits of turpentine ignites when brought in contact with copper which is at a temperature of 285 deg. Fahr. The corresponding temperatures for steel, aluminum and zinc are 425 deg. Fahr., 440 deg. Fahr., and 580 deg. Fahr. respectively. No relation exists between the flash point and vapor ignition temperatures as shown by the following table:

	Flash Point, Deg. Fahr.	Apparent Ignition, Deg. Fahr.
Gasoline	0.40	536
Turpentine	9.14	464

An air change every 3 min. can be considered ample when spraying operations are carried on in an open room. In addition to this precaution, care should be taken to remove all accumulations of dust from walls, floors and air ducts. Booth walls may be coated with a grease which will trap the dust. The grease coat should be washed off each night. Caution was urged in the use of inflammable solvents for the removal of accumulations of the finishing material to avoid creating a fire hazard.

Test Data on Heat-Treated Alloy Steels Correlated

PROGRESS made in the revision of the physical-property charts for certain of the automotive steels as proposed by the iron and steel division of the standards committee of the society, was reported by E. J. Janitzky, metallurgical engineer Illinois Steel Co., South Chicago, Ill., in a paper, the title of which was, "Correlating Test Data on Heat-Treated Chrome-Vanadium Steels."

Test specimens of S. A. E. steel 6130, to be drawn at three different temperatures after quenching, were prepared by four steel producers. Thirty cooperating laboratories then made a series of 115 tests, both physical and chemical. Results were shown in frequency or probability curves, rather than in straight line curves, since the latter are considered unsatisfactory because of the variables involved. The frequency

curves showed the specimens to contain a 12-point carbon range. They also disclosed tensile strengths of about 34,000, 27,000 and 24,000 lb. per sq. in. for draws at 800, 1000 and 1200 deg. Fahr. respectively.

Discussion was led by A. P. Kinzel, Union Carbide & Carbon Co.; J. H. Hurst, president of S. A. E.; and J. P. Cutter, Fafnir Bearing Co. The fact was disclosed that the curves now in use are the results of work in a particular laboratory, whereas the compilation reported by Mr. Janitzky represents the average of many different laboratories.

Other points brought out were that the new curves represent an effort to give the user more information on the inherent characteristics of the steel he is buying, but that the designer should be governed by the

minimum value of the range in the composition.

The opinion was generally expressed that this subject should again be brought up for discussion at the mid-winter meeting.

Metallurgy's Relation to Production

Cooperation of the metallurgical with other departments is, in the opinion of J. M. Watson, Hupp Motor Car Corporation, Detroit, who delivered a paper entitled "Relation of Metallurgy to Production," a vital factor in establishing a reputation for a company. The metallurgical department assists in design and the selection of materials; it oversees heat treating, and it can lend assistance in sales talks and give aid to the service department.

Metal Companies Exhibit at Chemical Show

Chromium Plating Impressive—Metallic Tantalum in Various Forms —New Heat, Acid Resisting and Other Alloys

SEVERAL booths at the Eleventh Annual Exposition of the Chemical Industries at the Grand Central Palace, New York, Sept. 26 to Oct. 1, offered exhibits of interest to the metal industry. A few of them are commented upon in the following paragraphs:

Chromium Plating Expands

A striking exhibit was that of the United Chromium Corporation, New York, which is the holding company for the Chromium Corporation of America, 120 Broadway, New York, and the General Chromium Corporation, 3220 Bellevue Avenue, Detroit. The strides which have been made in this new art were fully exemplified in many finished products which have been chromium plated, such as electrical goods, household utensils, cutlery of all kinds, surgical instruments, automobile headlights and bumpers. A new finish of chromium plated ware which attracted attention was that which has a dull appearance, resembling pewter, and which has been applied to coffee urns and other material for hotels. Prominent in the exhibit were steel tubes which had been lined inside and out with chromium and which are claimed to withstand high temperatures and pressures without corroding. The United Chromium Corporation has 53 licensees which are using the Crodon process developed by Dr. Colin G. Fink.

Metallic Tantalum in Many Forms

Tantalum in many form, such as sheets, bars, rods and in finished products such as small dishes, was the striking exhibit of the Fansteel Products Co., Inc., North Chicago, Ill. The ore from which this metal is made resembles a tungsten ore, wolframite, and although the method of recovery of the metal is not revealed it is understood to be a chemical one. One of the principal applications of metallic tantalum is in electrical rectifiers, which are now used on a large scale by railroads.

Hyblum—A New Aluminum Alloy

A new alloy called Hyblum was exhibited by Victor Hybinette, Wilmington, Del. Details concerning its composition and some of its properties are not yet available, but it is an aluminum alloy and was exhibited principally in sheet form, the metal being extremely pliable and ductile. The regular Hybinette metal was also displayed.

Special Alloys and Valves

In the booth of the Buffalo Foundry & Machine Co. there was a display of the lead-copper bearing metal Sumet in the form of cores and solid bars, castings, etc. This bearing metal is used on modern high-speed airplanes.

Valves of a number of interesting new alloys were displayed by the Merco Nordstrom Valve Co., New York, San Francisco and Chicago. One valve for high temperature service was a casting of 25 per cent nickel, 60 per cent copper, 10 per cent zinc, and 5 per cent tin and lead. Another valve, made up of castings for use in nitric acid plants, had a composition of 25

per cent chromium, 3 to 4 per cent nickel, with the remainder iron. There were also some interesting semi-steel valves which operate under a pressure of 250 lb., as well as many others of different compositions. There were several other companies which displayed special alloys in the form of valves and other products.

Some Steel Companies Represented

The Bethlehem Steel Co.'s exhibit consisted of a Bethlehem pulverizer for powdered coal and other materials under working operations. The main part of the lower structure was iron castings with the crusher jaws made of Mayari castings.

Several steel and alloy companies were represented, among them the Central Alloy Steel Corporation, whose exhibit was confined to its rustless iron and stainless steel products. The Vanadium Corporation of America had a diversified display of its many products and the Duriron Co., Inc., Dayton, Ohio, called attention to its high silicon iron and its special alloys for chemical and other work. Impressive also was the exhibit of the Aluminum Co. of America, New Kensington, Pa., where aluminum and aluminum alloys in all their many varieties made a striking impression. Also the International Nickel Co. had a similar display of monel metal, nichrome and other numerous products. The steel furniture people were also represented by the Laboratory Furniture Co., Long Island City, N. Y., and the Pressed Steel Tank Co., Milwaukee, Wis., also had a display.

A display which attracted considerable attention was the Udylyte Process Co., Detroit, which represents the protection of metal with cadmium.

Ford Makes Charcoal Briquettes

The Ford Motor Co. had a unique display which was a reproduction in miniature form of its plant for the production of charcoal briquettes. The briquettes have a fixed carbon content of 74 per cent, with an ash content of only 2.85 per cent.

There were numerous representatives of the various wire cloth makers, as well as practically all of the firms which produce microscopic and metallographic equipment.

The Industrial Development Board of Manitoba, a semi-official body, organized two years ago by the Manitoba Government and the city of Winnipeg to encourage a balanced growth of industry in the province, has published a brochure outlining the natural resources and industrial advantages of the Province of Manitoba and containing a list of 101 openings for industry. The brochure points out that there are more than 3000 commodities made in other provinces of Canada which are not made in Manitoba. The list given in the booklet includes only those best adapted to the Western field. Copies of the brochure may be secured by writing to the Industrial Development Board of Manitoba, Confederation Life Building, Winnipeg.

IMPROVES LINE OF PLANERS

Grouping of Controls and Automatic Lubrication Among Features of New Machines

IMPROVED planers designated as the type K and available in the 36 x 36-in. size and larger, have been placed on the market by William Sellers & Co., Inc., Philadelphia. The new machines combine certain basic features of the company's previous machines with improvements intended to add to the ease of operation.

High standards of accuracy are maintained in building the machine. All controls are grouped in the most advantageous location on the right-hand side of the planer, except in the case of the left-hand side head. Special attention has been given to lubrication. Where desirable, oil is supplied under pressure in individual pipes, and in other places reservoirs are provided with wick feed through tubes to the various points requiring lubrication.

Simplicity of the drive is a feature. There is but one shaft running through the bed and but one gear, a spiral pinion, located between the ways. The drive is by a reversing motor located at the right-hand side of the machine, as shown in the illustration. There is one reduction—a steel herringbone gear and pinion running in oil—between the motor and the main driving shaft which carries the spiral pinion. The spiral pinion is so designed that four teeth are always in contact and the angle of the rack is said to be such that no side pressure is developed from the pinion. The thrust from the spiral pinion is taken on step bearings which may be adjusted conveniently from the outside of the bed. Oil is circulated continuously through these thrust bearings.

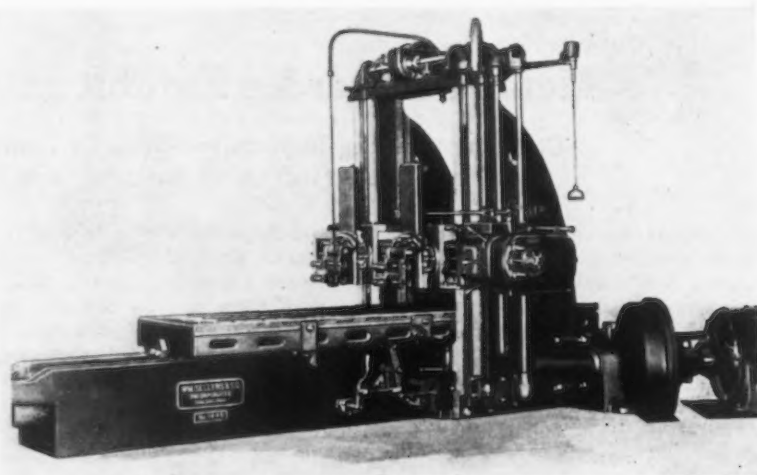
The table is of deep box section and is open at the side for the removal of chips. The rack is separate from the table and is made in sections and fastened to the table by clamps.

The crossrail is of deep box section between the uprights. In addition to the bearing on the face of the uprights, the crossrail slides on the inside near the point of application of the clamps. The clamping mechanism is arranged so that it fastens the crossrail to the uprights and at the same time ties the latter together at a point close to the work. The clamp is operated by a single lever. Two heads are usually provided on the crossrail and a side head on each

upright. The saddles, slides, etc., have been entirely redesigned and power traverse is provided for all heads.

The bed has one flat and one double V-way. The ways are supplied with oil from a pump driven by a separate motor. The control for this motor is connected with the driving motor circuit so that the pump will operate before the table starts, assuring adequate lubrication even after the machine has been standing idle for some time. The oil is forced through the grooves for the full length of the table and is collected at the ends of the bed and filtered before being returned to the tank.

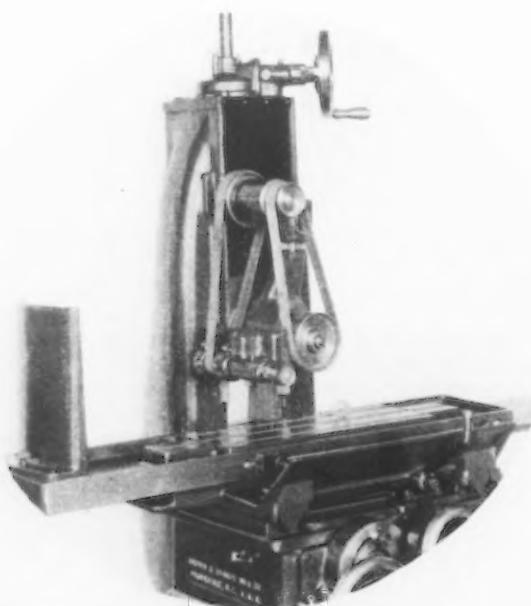
Levers for selecting the various feed motions are



Except for the Left-Hand Side Head All Controls Are Grouped On the Right-Hand Side of the Planer

located conveniently on the end of the crossrail. Change from feed to traverse is made by moving one lever. One head can be traversed while the other is feeding. The screws and shafts have micrometer dials to permit accurate setting of the heads. The feed is driven by a separate motor, which does not run continuously but is started and stopped at the proper time. The mechanism is arranged so that it is impossible to engage both the feed and traverse on the same head at the same time.

The tool slide is of the outside type. The length of the bearing between the slide and the swivel which carries it remains constant for short or long overhang. A ball bearing thrust is provided for the vertical feed screw and tapered gibs for all slides. Lubrication is from a central reservoir.



Surface Grinder Attachment for Grinding Small Slots and Similar Small Surfaces

Improves High-Speed Surface Grinding Attachment

An improved attachment has been brought out by the Brown & Sharpe Mfg. Co., Providence, for use on its No. 2 surface grinding machine. This device is designed for driving small grinding wheels ($\frac{3}{8}$ to $1\frac{1}{4}$ in. in diameter) at a high rate of speed, and is arranged so that it may be readily and quickly applied to the machine. By its use, slots and similar small surfaces located where a large wheel cannot be used, can be ground rapidly.

In employing the attachment, the wheel guard of the machine is removed and the attachment arm clamped on the wheelhead. Extending upward, this arm carries an adjustable bracket in which is mounted a countershaft. The grinding head is mounted on the main portion of the attachment arm, with its spindle parallel to the machine spindle. Both the grinding head and the countershaft bracket are adjustable for belt stretch.

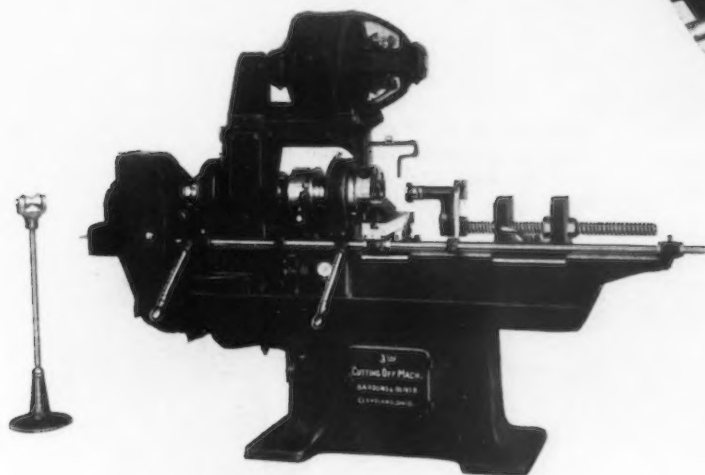
Drive is taken from a pulley mounted on the machine spindle in place of the regular grinding wheel, by means of a canvas belt to a pulley on the outer end of the countershaft. A second canvas belt transmits the drive from a larger pulley, on the opposite end of the countershaft, to the grinding head.

New Cutting-Off Machines for Bar Stock and Tubing

Simplicity of operation, convenient adjustment for different sizes and lengths of bar and rapid production are features of a new cutting-off machine being placed on the market by Bardons & Oliver, Cleveland. The machine is available in two sizes, of 1½-in. and 3-in. capacity, respectively.

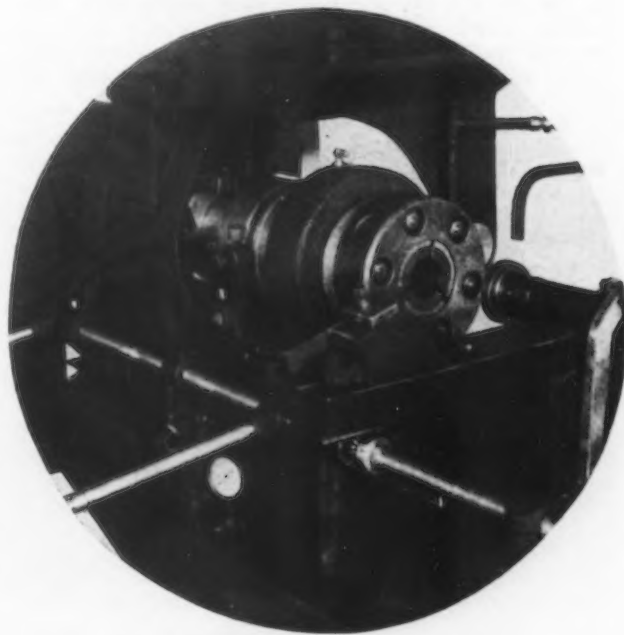
The machines are operated through the entire cycle by one movement of the hand lever. On average work not more than 3 to 5 sec. are required for opening of the chuck, feeding the bar or tube, closing the chuck and getting the tool back into the working position. It is said to be practical to make from 6 to 10 cuts per min., depending upon the kind of material and lengths to be cut.

An air-operated collet form of chuck is used, the master collet being of hinged type. False jaws for different sizes of stock may be changed without removing the collet from the spindle. Opening and closing of the collet is controlled by a valve on the front of the head. This valve is operated by a short arm on the shaft which carries the hand lever and the cross feed pinion.



The spindle is of large diameter and runs in tapered roller bearings. The cut-off slide is equipped with a tool holder and high-speed cutting blade, but multiple tool holders can be furnished if desired. The roller feed, driven by a ½-hp. motor, is in constant motion. Fur-

ther movement of the lever after closing the collet brings the feed rolls into contact with the stock, thus advancing it quickly against the adjustable stop. This stop is automatically withdrawn from contact with the end of the stock just before the tool starts cutting it.



OPERATION Through the Entire Cycle Is Actuated by One Movement of the Hand Lever. An air-operated collet-form of chuck, shown above, is employed

Connection between the driving motor and spindle is by means of sprockets and silent chain. A speed range of 4 to 1 in the motor is recommended. Weights for the two sizes are 3250 and 3500 lb. Both sizes require a floor space of 11 ft. over all in length by 3 ft. wide.

Electrically Controlled Automatic Cleaning and Pickling Machine

Two automatic cleaning and pickling machines, on which electric control is applied for the first time to govern the various steps in the process, have been installed by the Bridgeport Brass Co., Bridgeport, Conn. The machines are said not only to eliminate several men from the department, but also to provide greater production. They were built by the United States Galvanizing & Plating Equipment Co., Brooklyn.

Carriers on an endless chain convey the work to be cleaned and pickled, from a filling station, through the various baths, to an unloading station. General Electric motors and controls are used. On pressing a button, the carriers move from one position to the next and stop. After a predetermined time all carriers move to the next position. The time elapsing between moves is determined by setting a timing relay. One machine operates on a 70-sec. cycle; the other, on a 20-sec. cycle.

Automatic starting, conveying and stopping on such machines has usually been accomplished, in previous installations, by the use of an intermittent gear. In the mechanical method, the intermittent gear receives the brunt of the shock, with the result that it becomes a probable trouble center. By using electric control of the driving motor, more of a cushion effect is obtained and less strain and jar are transmitted to the machine.

Acquires Sole Ownership of Quickwork Company

H. Collier Smith, founder and former president of the Quickwork Co., St. Marys, Ohio, has purchased all the assets of the corporation and has also purchased all outstanding preferred and common stock of the corporation and will hereafter conduct the business in his own name as successor to the Quickwork Co. The company is the builder of Quickwork rotary shears and other sheet and plate metal working machinery. Mr. Smith says that the business is on an exceptionally sound financial basis.

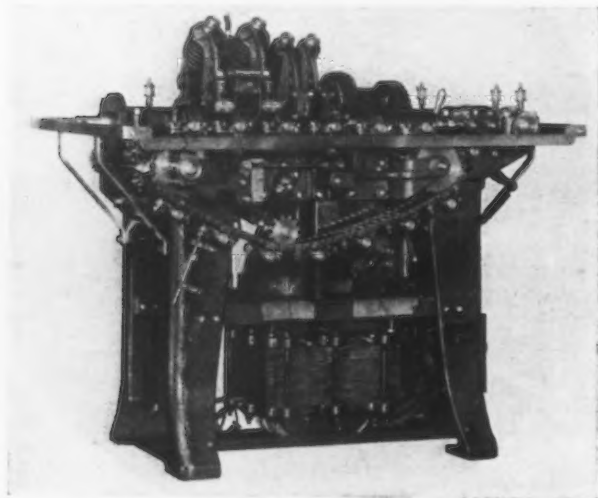
Transmission Problems Being Studied

A preliminary survey conducted in metal working and producing plants by the Power Transmission Association indicates that frequently users fail to consider the engineering and economic factors that enter in the selection of drives. Following further study of the industry, recommendations will be issued aimed to aid users in applying both group and individual drives.

The annual meeting of Power Transmission Association is to be held on Dec. 7 at Hotel Commodore, during the week of the Power Show in New York. A program is being arranged to bring out the cooperative development of better relations with users of power transmission equipment.

Automatic Machine for Welding Harness Rings

Designed especially for manufacturing harness rings, production at the rate of 30 rings a minute is claimed for the automatic ring welder here illustrated, which has been developed by the Thomson Electric Welding Co., Lynn, Mass. This machine, designated as the No. 28, not only makes the weld, but



The Machine Welds the Rings, Then Passes Them to a Striking Die and Then to a Trimming Die

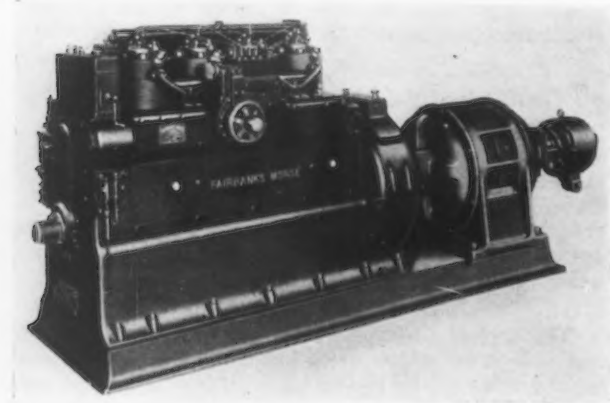
passes the welded ring to a striking die which flattens out the flash. The ring then is carried to a trimming die which shears off the flash. Rings from 1¼ to 2½ in. inside diameter are within the capacity of the machine, when made from wire of ¼ to 5/16 in. diameter. Larger rings, up to 4¾ in. inside diameter, may be made from wire up to 7/16 in. One set of locating fingers is required for making the smaller rings, and another set for the larger rings.

Operation is fully mechanical. Clamping, push-up, current control and burr removing are fully automatic. Operation is continuous, as the operator merely inserts rings in jigs mounted on the endless chain at the front of the machine. Clamping, welding, burr removing and ejection of finished rings follow in that order.

The machine occupies 31 x 42 in. of floor space, with overall dimensions of 48 x 60 in., and is 54 in. high. It weighs approximately 4500 lb. The water-cooled transformer has capacity for 100 kva. Drive is through a belt-and-gear reduction unit.

Diesel-Driven Power Unit

A new direct-connected generator unit driven by Diesel engine has been put out by Fairbanks, Morse & Co., Chicago. One of several types is shown in the illustration, this being a 35-kw. alternating-current unit operating at 720 r.p.m. It has a direct-connected exciter. Other units, of similar engine characteristics,



Self-Contained Generator Unit for Isolated Work

drive fans or other types of equipment. It is said that these units will operate on a total cost of not more than 1½c. a kwhr., of which about half goes for fuel and lubricating oil.

Fuel is sprayed through a nozzle at the top of the cylinder. Its injection is timed so that it enters the combustion chamber about as the piston reaches the top of its stroke. The pressure at this point is about 500 lb. per sq. in., the temperature being about 1000 deg. Fahr., or sufficient to ignite the charge.

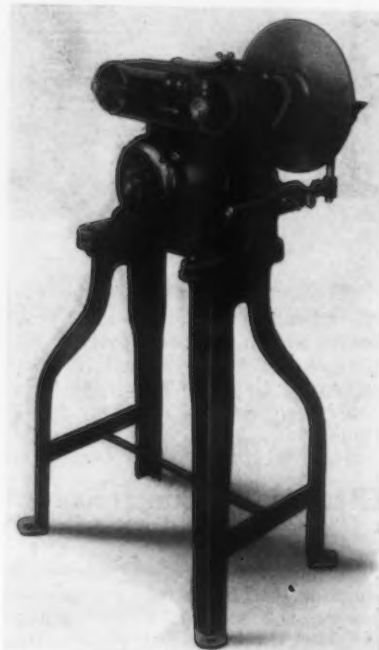
It is pointed out that combustion of the fuel is not explosive, as in a gasoline engine. It is a slower burning, resulting in an action more nearly like that of steam expanding.

To make the operation of such a unit as nearly automatic as possible, the lubricating system is entirely automatic. Streams of oil are forced under pressure by means of a pump or a mechanical lubricator.

Starting of the engine is accomplished with compressed air at about 250 lb. pressure. This is supplied by a small air compressor, the air being stored in a small tank. A particular feature which is stressed is simplicity, due to the small number of parts. The engine operates on the two-cycle principle, with airless injection.

Abrasive Band and Disk Grinder

A new motor-driven grinder, known as the Duplex-M, has been placed on the market by the Walls Sales Corporation, 96 Warren Street, New York. It includes both an abrasive band and a disk wheel. The former is 4 in. wide and with an operating surface 10¼ in. long. The wheel is 12 in. in diameter.



Rough Grinding Can Be Done on the Disk and Finishing Operations on the Abrasive Band

The band runs over a surface planed true, to produce level surfaces on the finish itself. The band may be brought to any desired position by adjusting two thumb screws. It can be quickly changed while the machine is in motion, by pulling out the lever to draw in one pulley and thus release it.

The 12-in. disk of steel is removable. It is fitted with a table which may be raised or lowered, or turned to any required angle. Rough grinding can be done on the disk, with the finishing work on the abrasive band. Thus a straight grain finish, rough, smooth or fine, according to the grit used, may be obtained on metal, composition or wood parts.

A ½-hp. motor, connected up by means of a silent-chain drive, runs at 1750 r.p.m. The floor space occupied is 20 x 24 in. The machine weighs 225 lb.

The United States Forest Products Laboratory at Madison, Wis., for the second time this year had to turn men away from a course in container construction. The recent rejection of applications was in connection with the course in box and crate construction.

Heavy-Duty Face Grinder Features Hydraulic Table Drive

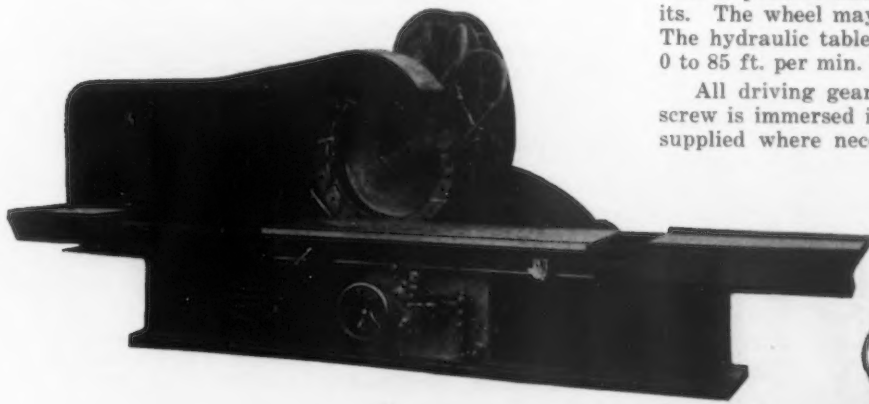
One of the important features of the face grinder illustrated is the fact that an infinite number of speeds is covered in the table range, from the minimum to the maximum. This makes it possible to fit the speed to any kind of material or finish. The machine is being put on the market by the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.

Other features stressed by the company are the type of spindle mounting, the convenient spindle brake, completeness of the feed arrangements, and the reversal

The ball-bearing spindle has automatic take-up of end play. Positive lubrication makes it self-maintaining for long periods. The front box contains a heavy combination thrust and radial bearing and one radial bearing. The rear box contains the same combination of bearings, together with the adjustable automatic take-up arrangement. The speed of the spindle is 400 r.p.m.

For grinding, a 42-in. wheel is used, with 18 sections, 4 in. face and 8 in. deep. It is said that the blocks may be worn down within 1 in. of the back without danger. The wheel feed is automatic hydraulic, with maximum of 0.010 in. and minimum of 0.00025 in. This is positive and is adjustable through narrow limits. The wheel may be fed up or backed out by hand. The hydraulic table traverse will give any speed from 0 to 85 ft. per min. with complete control.

All driving gears are splash lubricated. The feed screw is immersed in oil. High-pressure lubrication is supplied where necessary. Water supply comes from



A WIDE Range of Table Speeds Is Made Available by the Use of Hydraulic Table Drive. Other features include the spindle mounting, spindle brake and treadle control for carriage reversal



of the carriage by foot treadle. Special attention has been given to rigidity, so that heavy loads may be handled.

Work up to 86 in. in length and 33 in. in height may be ground. The length of the table is 12 ft. 8 in., with width 32 in. It has six T-slots for holding the work, and is 34 in. above the floor. The bed measures 13 ft. 8 in., with ways 22 in. apart. The back extension has a way spread of 38 in. and length of 4 ft. 2 in.

a centrifugal pump delivering through two 1-in. pipes to the grinding wheel.

The main driving motor is of 60 or 75 hp. and may be either a.c. or d.c. A suitable speed range is from 700 to 900 r.p.m. The carriage driving motor, with the same speed range, is of 7½ hp. A 1-hp. motor at about 1200 r.p.m. drives the pump.

This machine occupies a floor space 10 ft. 6 in. x 28 ft. 4 in. and weighs about 23,000 lb.

Electric Truck for Handling Tin Plate

Designed for handling tin plate or steel sheets up to its capacity of 5000 lb., a new electric elevating truck has been placed on the market by the Baker-Raulang Co., Cleveland. The machine is of compact design and may be driven inside the average box car.



The Capacity Is for 5000 Lb. of Sheets. Compactness is a feature

The driving axle, of the full floating type, operates with a 17½ to 1 worm gear reduction. The driving motor is mounted on a cradle cast integrally with the axle housing, thus assuring definite alignment. To facilitate steering, the knuckle pivots are in line with the centers of the tires. The trailing axle, which also has the pivots in line with the tire centers, is machined from forged alloy steel.

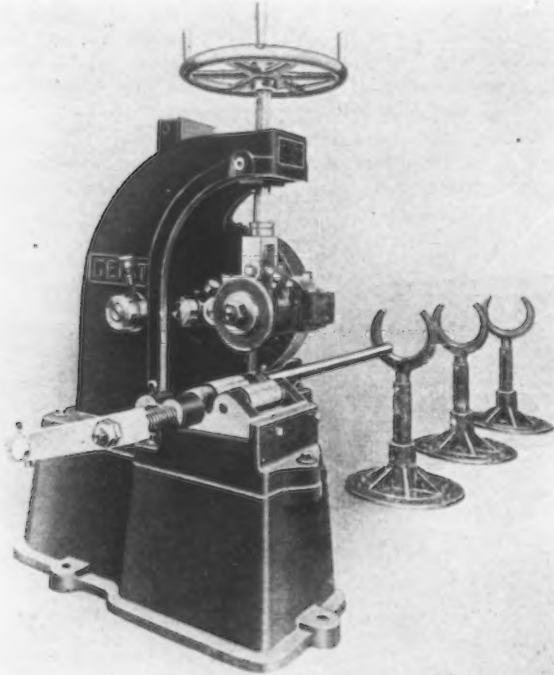
Two drums are furnished for the hoist, the selector switch determining which drum will be used. They are driven by a series-wound motor. One cable hoists the carriage and forks while the other tilts the superstructure sufficiently so that a load cannot slide off.

When picking up the load, the superstructure is vertical. The forks will lift high enough to stack loads one upon the other. To bring the fork prongs under a load, it is possible to tilt the superstructure forward a little so that the prongs come in contact with the floor.

Safety devices include limit switches to open the hoist motor circuit at both limits of travel of the carriage and of the superstructure. An automatic switch of the quick-break type is provided with auxiliary carbon contacts. This interlocks with the controller and prevents operation of the truck except by conscious action of the operator.

Heavy-Duty Roller Pipe Cutter In Two Sizes

Two high-production heavy-duty roller pipe cutters in 4-in. and 6-in. sizes have been added to the line of the Geist Mfg. Co., Waynesboro, Pa. The smaller machine has a range from 1½ to 4 in., but by adding a small cage of rollers it can be used for cutting off pipe from ½ to 4 in. The standard range of the 6-in. machine is from 3½ to 6 in., but with a small cage of rollers the range is increased from 1 to 6 in. The ma-



The Cutters Are of Tool Steel, Heat Treated, and Can Be Reground When Dull. Two Sizes of the Machine Are Available

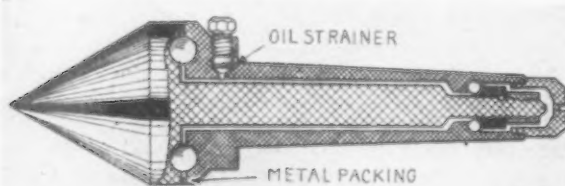
chines are being marketed by the Landis Machine Co., Waynesboro.

The cutter, of tool steel, is heat treated. It is lowered to the pipe by means of a handwheel at the top of the machine. The cutter shaft bearing has an adjustable cap for taking up wear. Rollers supported in a cage bolted to the machine are carried in roller bearings and are made of tempered tool steel. The length gage is adjustable for different sizes and lengths of pipe and will gage lengths up to and including 40 in. All parts coming in contact with the revolving pipe are hardened for resisting wear.

Rigidity and strength are stressed in the design. The gage arm is a heavy forging. All spindles and shafts are ground and run in bronze bushed bearings. While the gears are inclosed, they are easily accessible. The machine may be driven by belt or motor. The 4-in. machine requires a 3-hp. motor, while a 5-hp. is required for the larger unit. When motor driven, the power is transmitted to the machine through gears.

Heavy-Duty Ball-Bearing Center

A new heavy-duty center of the ball-bearing type, brought out recently by the Snellx Mfg. Co., Rochester, N. Y., is here illustrated. The center was designed



The Front Ball Bearing Is of Larger Size Than Usual. The centers may be had with any kind of point for turning, grinding, milling, etc.

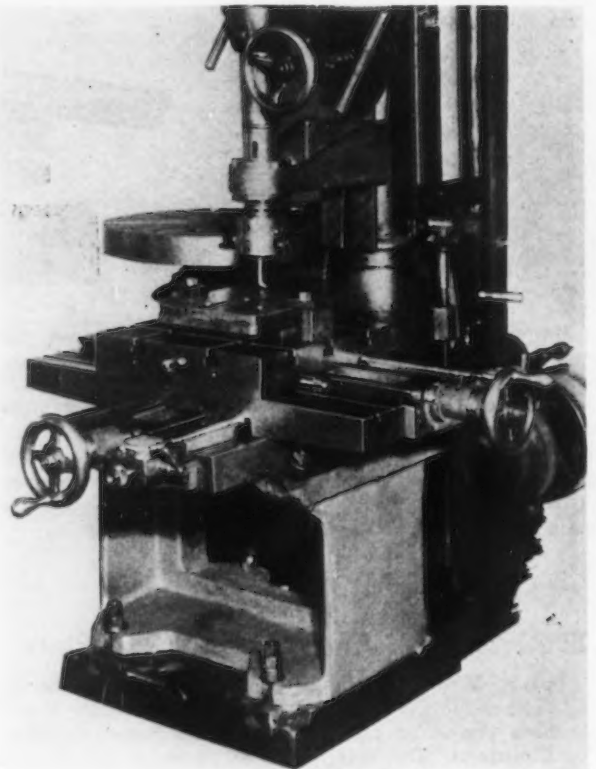
to permit greater speed of operation without burning the center point.

The principal feature is the front ball bearing, which is of larger size than usual. In the ball bearing the races are cut deep so that the balls are almost completely embraced, which arrangement is said to assure maximum load-carrying capacity for both radial and thrust loads. Another feature is the metal packing, which closes up the space between the rotating center point and the tempered sleeve. This packing is lapped-in to prevent the entry of chips and dirt into the ball bearings. An oil strainer is placed at the bottom of the oil hole to strain solids which may enter during oiling. The ball bearings are lapped to alignment with each other, and the tapered shank is hardened and ground. Any taper and any kind of point can be furnished to suit requirements for turning, grinding, milling, spinning and wood-burning.

Jig Spacer for Vertical Milling Machines or Upright Drills

Precision of spacing in the making of jigs, fixtures and gages is claimed for the device here illustrated, which is designed for use on any standard vertical milling machine or upright drill, as well as on planers, shapers or slotters.

The device is known as the Johnson jig spacer and is being marketed by the Trundle Engineering Co., Card Building, Cleveland. It consists of a base upon which are mounted two slides which travel at right



The Jig Spacer Is Made Up of a Base on Which Two Slides Are Mounted at Right Angles to Each Other

angles to each other. Accurate control of spacings is obtained by using standard, fixed, end-measuring gages furnished with the fixture. These are used with indicators which are a part of the equipment. Accuracy is said not to depend upon the table feed screws. The clamps for locking the slides in position are entirely independent of the gibs and do not disturb their setting. They consist of an arrangement of levers operated in a T-slot and clamp the flat surfaces of the slides in such a manner as not to disturb the setting or alignment.

The work table measures 16 x 16 in. and has a transverse travel of 12 in. The short slide is 26 in. long; the long slide, 32 in. The longitudinal travel is 15 in. The floor space covered measures 37 x 45 in. and the net weight of the device is 525 lb.

Combination Shear, Funch and Coper

Punching, plate and bar shearing, angle and tee cutting and mitering, coping and notching can be done without interchanging attachments on the combination shear, punch and coper placed on the market recently by Joseph T. Ryerson & Son, Inc., Sixteenth and Rockwell Streets, Chicago.

The arrangement of the machine may be noted from the illustration. The main frame is a one-piece alloy steel casting which extends from the floor up to the motor shelf. Two heads are mounted in the frame; a sliding head carries the punching attachment and a



Punching, Plate and Bar Shearing, Angle and Tee Cutting and Mitering, Coping and Notching May Be Done on the Machine

swinging head carrying all of the various shearing attachments. The shearing attachments operate together as a unit and are independent of the punching end, each head being controlled by a separate clutch operated by a foot lever. Clutches are of three-jaw type permitting the operator to engage the clutch at each third of a revolution of the clutch gear. Gears and pinions are of steel with teeth cut from the solid. Bearings are bronze bushed and special attention has been given to lubrication.

The working heights of the various attachments are such that the feet of the machine can be placed directly on the floor. The frame has a 15-in. throat in the punching end and is arranged for an architectural type of jaw block. Two standard architectural jaws are furnished to permit the punching of both light and heavy structural shapes and to facilitate punching holes in the flange and web of I-beams and channels. A universal hold-down is provided for stripping material in punching. The frame is offset to allow the free passage of plates in splitting. A vertically adjustable hold-down is provided for the splitting shear.

The angle and tee shear opening is located just above the bar shear and the shear blades are made in sections to facilitate grinding. The shear is also arranged for making both inside and outside cuts on tees and angles. A single hold-down is furnished, and this hold-down also forms a guide for accurate square and miter shearing. The bar cutter blades consist of an upper and lower member, each blade having two round notches and two V-notches. The plate shearing attachment is directly below the bar shears. The upper and lower blades are exactly the same, each having four cutting edges. The die holder is a separate member and is supported and backed by an extension of the main frame. This block is triangular and permits not

only of coping light I-beams and channels but also notching of angles, tees and zee bars and other material. A square notching attachment can also be used.

Either belt or motor drive arrangement can be furnished. The specifications are as follows: Capacity to punch, 13/16 in. through 3/4 in.; shearing capacities, plates 1/2 in.; flat bars 5/8 x 6 in.; round bars, 1 1/4 in.; square bars, 1 1/2 in.; angles, 4 x 4 x 3/8 in.; tees, 3 x 3 x 3/8 in.; angles and tees in miter, 3 x 3 x 5/16 in.; cope, beams and channels, 6 in., lightest section; and notch, angles and tees, 3 x 3 x 5/16 in. The weight of the machine is 5100 lb. net.

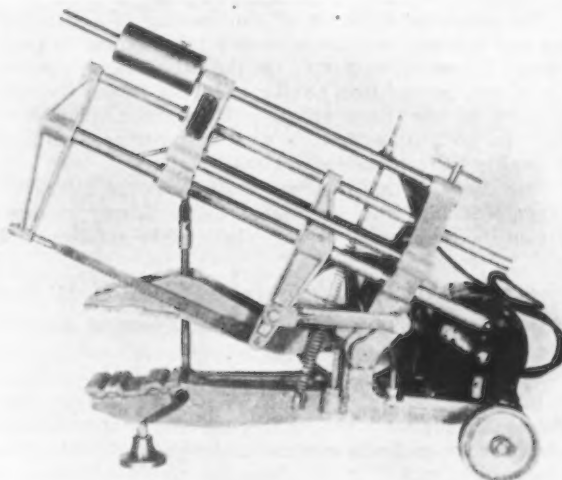
Heat of Transformation of Nickel and Cobalt

Using a calorimeter, the specific heats of commercially pure nickel and cobalt, and of Mond nickel and electrolytic cobalt were determined at various temperatures by S. Umino at the Yawata Steel Works in Japan ("Science Reports" of Tohoku Imperial University, June, 1927.) It was determined that the magnetic transformation in nickel occurring between 250 and 400 deg. C. absorbs 2.01 calories per gram. The similar transformation in cobalt, occurring in the vicinity of 1150 deg. C., absorbs 2.00 calories per gram. The allotropic change in crystal lattice in cobalt occurring on heating through 477 deg. C. requires 1.05 calories per gram.

Portable Motor-Driven Hacksaw

Moving the tool to the job may be accomplished by a new hacksaw of the Wolff Machine Co., 23 Clare Street, Buffalo. It operates on power from any lighting circuit, the motor being of 1/4 hp. The whole machine weighs 160 lb. and it may be wheeled through a space 18 in. wide.

As shown in the illustration, the jaws may be clamped upon any form of stock within the capacity of the machine, which is up to 6 in. square. Adjustment of the weight makes possible heavier or lighter



The Machine May Be Moved to the Work, and Current for the Motor Taken from a Lighting Socket

cuts, according to requirements. When necessary, the saw may be hoisted or lifted to a job off the ground. It will hang to the work by its own jaws while sawing, as the saw works in any position.

Installation of a new continuous sheet mill is planned by the Otis Steel Co., "when perfection of the much discussed process is completed," according to E. J. Kulas, president of the company, in a statement made on his departure for a brief European trip. The company has a surplus of \$2,000,000 in cash, with which to finance such a major improvement, Mr. Kulas said. During the two full years of the present management the sum of \$7,334,375 has been expended by the company for maintenance, repairs and improvements.

Foundry Problems Discussed in Paris

Both Ferrous and Non-Ferrous Work Covered

—Many Topics Engrossed the
International Meeting

LAST week, on page 876, we presented briefly some of the main features developed at the meeting in Paris of the International Foundry Congress. In the following paragraphs will be found a digest of the principal papers, together with the main points brought out in their discussion. Lively interchange of views,

not always in complete accord, followed the reading of some of the papers. Of those presented, one was an exchange paper from the German Foundry Association, one from the American Foundrymen's Association (published last week) and one from the Technical Association of Belgian Foundrymen.

Digests of the Principal Papers and Discussions

A Curious Example of Pig Iron Thermic Treatment

BY MESSRS. LE THOMAS AND DOMANSKI

AT the foundry plant of Etablissements d'Indret, the earthen mold of a solid shaft having given way slightly under the pressure of liquid cast iron, a hollow was formed in the piece, which required more hot iron to fill it. The first iron had normally solidified, but the second had slowed down the cooling. Then it occurred to the authors of this communication to examine the structure of both. The casting, having been made from pig iron of very good quality, should have been pearlitic. But the first iron showed a structure much different from that corresponding to the so-called pearlitic nature, while the second iron showed a structure corresponding to the pearlitic type, but in its worst state, by reason of the size of pearlite laminae.

The extreme slowness of the cooling of the second iron had allowed pearlite elements to assemble in broad slips at below 700 deg. C. On the other hand, the contact of this second iron having suddenly raised the temperature of the first, this first sustained graphitization. In fact, its structure was that corresponding to the stable ferro-graphite system.

The study of this incident shows that the properties of pearlitic pig iron are likely to be deeply modified by thermic treatment taking place after solidification.

Separation of Graphite from Gray Cast Iron (Exchange paper from the German Foundry Association)

BY PROFESSOR DR. SCHUTZ

TO obtain higher strength in cast iron it is necessary to provoke as fine a separation from graphite as possible, which result is obtained by the production of eutectic graphite. In his communication Doctor Schutz explains how the diagram of iron-carbon was established. He says that science is more and more tending to admit the double diagram, which diagram is now turned to use by some German plants. He thus studies the artificial separation of graphite in the eutectic form.

Emmel has been able to obtain good results inside the crucible by using sufficient superheating. Klingenstein uses a combined reverberatory furnace with crucible, and a tensile strength up to 34 kg. (48,000 lb. per sq. in.) has been obtained by him with a total carbon between 2.70 and 3 per cent. Experiments made by Doctor Schutz in 1925 led him to the following process: by throwing into a mold cast iron containing more than 3 per cent of silicon, eutectic graphite may be formed, independently from the total carbon contents.

New studies by Klingenstein, Piwowsky and Han-nermann concerning the influence of temperature, of fusion and superheating on the formation of graphite inside cast iron have improved our knowledge of this matter. But it still needs studying to obtain a cast

iron the texture of which may be regulated exactly like that of steel.

Opposes Multiple Hypotheses

Professor Portevin points out that, while other work has been done on the persistence of graphite inside cast iron (aside from that mentioned by Doctor Schutz), yet some of the hypotheses set forth have been known for quite a while. In his estimation, one should not superpose so many hypotheses, but should adopt one only.

Insisting on the fact that the decomposition of mixed crystals takes place in the author's process without any slow cooling down, he asks what is the decomposition process of these mixed crystals? Doctor Schutz confirms the view that the germinatory power of primary crystals has a great influence on the formation of eutectic graphite.

Answering various questions from Mr. Portevin, Doctor Schutz stated that such a cast iron may be obtained in a crucible at about 1300 deg. C., with 3 per cent silicon and 0.02 to 0.09 per cent manganese. As to cooling, it is very rapid, since the iron in question is cast inside a mold.

On the Influence of Alumina on the Casting of Aluminum

BY M. F. RENAUD

IT is known that melted aluminum invariably gets covered by a thin film of alumina, when exposed to the air. One must avoid an exaggerated formation of this oxide, which is favored by bath decanting or agitation, or the turbulent entrance into molds. The author calls it alumina of immediate oxidation.

According to Mr. Fleury, the sheath around every mass of melted aluminum (by aluminum is understood here an alloy with a high content of Al) has a considerable surface tension. Its introduction diminishes the fluidity.

The alumina incorporated inside the liquid by drawing it along is called by Renaud prior-oxidation alumina. It remains in the shape of filaments, of films inside the metal, and affects its flowing. The author does not believe in decanting it to make it disappear. The so-called "change of direction" process seems more logical to him. A third process, filtering, although prohibited by some metallurgists, seems to him to give good results also.

Heredity in Cast Iron

BY ANDRÉ LEVI

MAY two cast irons of identical chemical composition have mechanical properties that differ? This question is still being discussed. One tends now toward saying "yes." According to the author, the fact that two cast irons of equal analysis have differing characteristics can be explained only by a difference of structure. To explain this difference of structure cast irons

must be allowed hereditary properties, since the variation in cooling time may not be considered, as, by altering the structure, it alters the chemical analysis as well.

It is known that the mechanical characteristics of a cast iron are, above all, determined by: total volume, thickness of sections and separation of the graphite. Therefore, we must turn to the study of graphite evolution. Mr. Levi sets forth the hypothesis that particles of graphite in some cases may remain in the crucible, in the course of melting, which particles favor the formation of thick flakes during cooling.

Open grain pig irons (large flakes) in which graphite has not had time to dissolve completely should for a long time keep their property of solidifying and give large grains. But in the case of finely divided graphite sows, as this graphite dissolves completely in the course of melting, the formation of constitutional graphite should be only in very thin slips, even in the course of several repeated meltings.

Study of Metals and Non-Ferrous Alloys and Its Uses in the Foundry

BY A. PORTEVIN

WHILE for steels the macrostructural image and the micrographic one are different, and their origins distinct, for non-ferrous industrial alloys there is no essential difference between macrography and micrography. It is only the same structure which reagents reveal, a structure visible to the eye in molded products.

After developing the genesis of the solidification structure, and the chief aspects of this structure, Professor Portevin studies how such structures are to be interpreted. Two chief points are to be considered:

1. The size of grains or their number per unit of surface;
2. The shape and direction of these grains, which may be either almost equally developed in every direction, without any prevailing direction (structure with equiaxial grains or without direction); or, on the contrary, these grains may be prolonged along definite parallel directions (basaltic structure), or converging (radial structure).

The author explains what are the gradient of temperature, and the speed of cooling and how these two variable factors are influenced by what he calls "foundry factors."

The chief factors working upon crystallization, and consequently upon the structure of pieces, are:

1. The agitation of the liquid in process of crystallizing;
2. The rate of cooling and the gradient of temperature;
3. The nature of the metal or alloy.

Examination of the influence of each of these factors leads to interesting applications, including the study of feeding areas of a molded piece and the determination of places where chills are to be placed.

Mr. Portevin concludes that the difficulties and defects in foundry practice have their origin largely in the unequal heat capacity (anisothermy) of pieces while they are either solidifying or in course of cooling. Macrostructure materializes under a visible shape one of the results of such inequality. Therefore its study may provide useful and valuable indications.

A Few Properties of Special Brass with Manganese Nickel

BY MR. LE THOMAS

IN this communication Mr. Le Thomas gives an account of the complementary researches he effected on special brass with important proportions of nickel and manganese (respectively 5 per cent and 3 per cent) standard 59/41, which he presented at the Liège Congress in 1925.

By studying the mechanical characteristics of this high-temperature brass, Mr. Le Thomas reached the conclusion that the breaking load and elongation vary comparatively little with the temperature. Per contra, the Brinell hardness goes down definitely, when temperature goes up. The shrinkage of this alloy may be estimated at 1.13 per cent. Its melting temperature, as measured by a registering pyrometer, was found to

be 885 deg. C. It does not seem that there is any advantage in submitting such brass to tempering. Its resistance against corrosion is very great, as compared with other alloys.

Electric Furnace Melting of Copper Alloys

BY R. LEMOINE

TWO types of furnaces which seem most suitable for the fusion of copper alloys are arc furnaces and induction furnaces using low-frequency current. For foundry use, the latter have some inconveniences: Production of alloys, either rich in copper or rich in lead, requires reducing the fire down to the "glow" point for non-continuous production. This makes it difficult to melt a certain quantity of metal, when in the course of the day the alloy produced by the one furnace has to be altered.

Is the electric furnace commercially advantageous in the copper alloy foundry? Mr. Lemoine thinks one would be wrong in refusing, *a priori*, to examine the possibilities of using such a furnace.

Uses of the Electric Furnace in the Iron Foundry: Duplex Process

BY R. LEMOINE, PRESENTED BY M. VANZETTI

AS the electric current cost is generally high, the endeavor is to reduce the time during which it is used. If melting be commenced in the crucible, to be completed later in the electric furnace with the addition of a good ore, one may save 30 per cent of current consumption. Experiments have been made on this idea at Milanese foundries with a small crucible and two electric furnaces. The alternate use of the electric furnaces allows a steady use of the current.

One must consider the wearing of the furnace roof and of the electrodes due to the addition of ore, a practice which is considered by several technicians as dangerous. Mr. Vanzetti states that this method seems economical to him and intends making new experiments along these lines.

Tests of Pig Iron

TWO interesting communications were presented on this matter. They are from M. Girardet: "Simple and Rapid Method for the Control of Mechanical Properties of the Structure of Cast Iron," and from P. Herman and H. Henquin: "A Few Trial Methods and Properties of Various Gray Cast Irons"; presented by M. Carlier (exchange paper from the Technical Association of Belgian Foundrymen).

M. Girardet advocates shearing tests made with the Fremont machine, but measuring to 0.01 mm. Two rectangular diameters of the polished gage will be compared, with the aim of having a corrected surface to which the shearing load will be applied. Then he determines the hardness of the sheared section itself by means of a small, special machine developing a pressure of only 76 kg. on a ball 1.59 mm. (1/16 in.) in diameter.

P. Herman and H. Henquin point out in their communication that, in hardness tests of the 10/3000 order, they noted that the edges of the print split under the load. This statement is contested by Mr. Le Thomas. They advocate shearing by punching to replace tests by mere shearing.

This method of shearing by punching was sharply discussed. First, as Mr. Le Thomas observes, frictional resistances are much greater than in the case of single shearing. The hole is always conical, in spite of all precautions taken. Lastly, the test by punching does not allow more than one gaging, whereas it is interesting to repeat tests, to make sure that they are normal.

As regards the correlation between mechanical properties and the constitution of gray cast iron, Mr. Le Thomas agrees with the authors of this communication, acknowledging that the thermal treatment of pig irons is not interesting as a process of improving physical and chemical properties, but only as a stabilizing treatment to soften cast irons by augmenting their graphitization.

Activity Increases in European Centers

Both England and Germany Show Gains—France Fails to Keep Pace—Austrian Outlook Fair

(By Cable)

LONDON, ENGLAND, Oct. 3.

DEMAND for Cleveland pig iron is improving considerably, both domestic and export users buying more freely. With some contracts placed for delivery into January, the Palmers Shipbuilding & Iron Co., Jarrow-on-Tyne, is considering blowing in an additional blast furnace, but other makers are as yet undecided, owing to the low selling prices.

Hematite is rather dull and, although export inquiry is expanding, prices are barely maintained. Foreign ore continues quiet.

Finished steel is dull, but makers are expecting a revival of business in ship steel as a result of new shipbuilding contracts placed recently. Structural engineering plants are active, but plate mills are in need of orders. The Clyde shipbuilding output in September was 17 vessels of 57,000 tons.

German Mills Report Keen British Competition

(By Radio)

BERLIN, GERMANY, Oct. 3.

MARKET activity continues in iron and steel, but scrap is quiet. British competition in pig iron is increasing and the German Pig Iron Syndicate has reduced prices on hematite, Siegerland steel making iron and spiegeleisen by 3 to 6 m. (\$0.71 to \$1.43) per ton.

Prices quoted by the German Steel Syndicate are unchanged, but there have been concessions in prices on medium and thin gage sheets as a result of increased competition.

Present orders on the books of steel companies insure full occupation for the next three months. Rail mills are active with orders booked for the next five months and large purchases in prospect for 1928 by the railroads corporation.

The domestic market on pipe and tubes is improved, but export is at unprofitable prices as German producers meet the low priced competition of British

Tin plate inquiry is improving, but business is still quiet. However, if the present inquiries mature considerable tonnage will be booked. Makers are showing less desire to sell at low prices and 18s. (\$4.37) per base box, f.o.b. works port, is now the lowest accepted price.

Galvanized sheets are inactive in export to India, but moderate small sales have been made to other countries. Black sheets are quiet generally with some merchant sales of Japanese specifications.

Continental iron and steel is quiet and British consumers are buying lightly. Export demand is poor and with makers in need of orders prices are weaker. A Belgian-French rail syndicate has secured 51,000 tons of rails from Manchuria.

The Luxemburg output for August was 238,000 tons of pig iron and 216,000 tons of steel ingots and castings. There were 41 furnaces in blast Sept. 1.

makers. Shipbuilding is quiet, but further improvement is evident in the machinery, electrical and automobile industries.

Austrian Exports Small and Agreement with France Sought

VIENNA, AUSTRIA, Sept. 20.—Domestic business has been showing some improvement, but export trade is unsatisfactory and limited to nearby markets. Unemployment has declined but at the beginning of September the total of unemployed was 135,900, which is large.

The outlook for business is considered fair, but the engineering industry is under the impression that it will suffer considerable loss as a result of the Franco-German commercial treaty, concluded Aug. 17. As France and Austria have no agreement for most-favored-nation treatment, the special reductions made under the new treaty with Germany will not extend to Austria. In consequence it is hoped that negotiations will be initiated for some similar agreement.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 18s.			\$4.37	
Bilbao Rubio ore f.	1 1	to £1 1 1/4s.		5.10	to \$5.16
Cleveland No. 1 fdy.	3 10			17.01*	
Cleveland No. 3 fdy.	3 7 1/2			16.40*	
Cleveland No. 4 fdy.	3 6 1/2			16.16*	
Cleveland No. 4 forge	3 6			16.04*	
Cleveland basic (nom.)	3 15	to 3 15 1/2		18.23	to 18.35
East Coast mixed.	3 15			18.23	
East Coast hematite	3 15 1/2			18.35	
Rails, 60 lb. and up.	7 15	to 8 0		37.67	to 38.88
Billets	6 0	to 6 10		29.16	to 31.59
Ferromanganese	12 0	to 12 10		58.32	to 60.75
Ferromanganese (export)	11 0	to 11 5		53.46	to 54.68
Sheet and tin plate bars, Welsh	5 11 1/2	to 5 15		27.09	to 27.95
Tin plate, base box.	0 18	to 0 18 1/4		4.37	to 4.43
Black sheets, Japanese specifications.	13 15	to 14 0		66.83	to 68.04
Ship plates	7 12 1/2	to 8 2 1/2		1.65	to 1.76
Boiler plates	10 10	to 11 0		2.28	to 2.39
Tees	8 2 1/2	to 8 12 1/2		1.76	to 1.87
Channels	7 7 1/2	to 7 17 1/2		1.60	to 1.70
Beams	7 2 1/2	to 7 12 1/2		1.55	to 1.65
Round bars, 3/4 to 3 in.	7 12 1/2	to 8 2 1/2		1.65	to 1.76
Steel hoops	10 10	to 11 0		2.28	to 2.39
Black sheets, 24 gage	10 5	to 10 10		2.22	to 2.28
Galv. sheets, 24 gage	13 15	to 14 0		2.98	to 3.03
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5		3.03	to 3.09

*Export price, 2 1/2s. less for 500 tons or more.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron: (a)					
Belgium	£2 18s.	to £3 0s.	\$14.08	to \$14.58	
France	2 18	to 3 0	14.08	to 14.58	
Luxemburg	2 18	to 3 0	14.08	to 14.58	
Basic pig iron:					
Belgium	2 17	to 2 17 1/2	13.83	to 13.96	
France	2 17	to 2 17 1/2	13.83	to 13.96	
Luxemburg	2 17	to 2 17 1/2	13.83	to 13.96	
Coke	0 18		4.37		
Billets:					
Belgium	4 3	to 4 5	20.17	to 20.67	
France	4 3	to 4 5	20.17	to 20.67	
Merchant bars:					
Belgium	4 12	to 4 13	1.02	to 1.03	
France	4 12	to 4 13	1.02	to 1.03	
Luxemburg	4 12	to 4 13	1.02	to 1.03	
Joists (beams):					
Belgium	4 10	to 4 12	0.99	to 1.02	
France	4 10	to 4 12	0.99	to 1.02	
Luxemburg	4 10	to 4 12	0.99	to 1.02	
Angles:					
Belgium	4 12		1.02		
1/4-in. plates:					
Belgium (a)	6 5	to 6 6	1.38	to 1.39	
Germany (a)	6 5	to 6 6	1.38	to 1.39	
3/8-in. ship plates:					
Belgium	6 1	to 6 2	1.33	to 1.34	
Luxemburg	6 1	to 6 2	1.33	to 1.34	
Sheets, heavy:					
Belgium	6 1		1.33		
Germany	6 1		1.33		

(a) Nominal.

FRENCH ACTIVITY LOW

Little Fall Buying Disappointing—Export Business Develops Low Prices

PARIS, FRANCE, Sept. 23.—Depressed business conditions continue, and with the lack of any development of fall business, producers are not in a very satisfactory position to go through the winter. While August showed a slight decline in the cost of living, which might permit reduction of costs, if it continued, there is some doubt that there will be any further decrease in September.

There is considerable complaint by French engineering companies at the large orders going to Germany on reparations account. In opposition to their views it is pointed out that France is profiting by these reparations deliveries.

Pig Iron.—Demand is declining and some producers are considering reduction of output. Producers of phosphoric foundry iron at a recent meeting decided upon a reduction of domestic prices for October, but took no action on the export market, which will probably continue to be determined by competitive conditions. An allotment of 30,000 tons for domestic foundries was established for October, this to include all deliveries on old contracts, as well as new business. Hematite iron producers at their meeting renewed their entente for another three months from Oct. 1 and while base prices were left unchanged some downward revision was made in the quotations for certain lines in the domestic market. These readjustments of price are the result of foreign competition in the French market. An allotment of 25,000 tons of hematite exclusive of deliveries on old contracts was set aside for October with a provisional quota of 15,000 tons for November and 5000 tons for December.

Semi-Finished Material.—The export market is weak with German competition severe. Blooms are quiet at £3 18s. to £4 2s. (\$18.94 to \$19.92) per metric ton, f.o.b. Antwerp, depending upon the specification. Demand for billets, however, is increasing, but prices continue to show weakness at £4 3s. 6d. to £4 6s. (\$20.29 to \$20.89) per ton, depending upon the sizes. The market for sheet bars is irregular. Some mills are quite firm while others are willing to grant concessions. Prices range from £4 7s. to £4 7s. 6d. (\$21.13 to \$21.25) per ton, f.o.b. Antwerp.

Finished Material.—Domestic business shows a slight improvement in some sections, but there is serious complaint that the fall has brought so little change from the summer dullness. In the export market competition is keen and the volume of tonnage under consideration is small. There seems to be some belief that improvement will come from the next meeting of the International Steel Cartel. Beams are quiet at from £4 9s. to £4 10s. per ton (0.98c. to 0.99c. per lb.) f.o.b. Antwerp. Merchant bars range from £4 13s. to £4 13s. 6d. per ton (1.02c. to 1.03c. per lb.), a slight recession of price to meet the German and Luxemburg mills. The black sheet market continues depressed, but mills are endeavoring to maintain prices on the heavy and medium gages. On light gage sheets there has been a considerable reduction of price in domestic sales, but the export market on sheets is holding fairly firm.

Seasonal Quiet in British Machinery Industry

WASHINGTON, Oct. 4.—Seasonal quietness prevails in the British machinery industry and the situation shows little recent change, according to a cable from Commercial Attaché William L. Cooper, London. The settlement of the wage question is considered a hopeful factor and several large locomotive contracts have been obtained which will insure moderate activity during the fall. Manufacturers of heavy machine tools have experienced slack business, but an improved demand is in evidence in the small machine tool trade. Makers of textile machinery are chiefly occupied with foreign orders because of the dullness of the domestic trade. Dullness is likewise being experienced in the boiler-making and marine engineering industries.

JAPANESE RECOVERY SLOW

Government Aid for Going Concerns—Suzuki Problems Unsettled

KOBE, JAPAN, Sept. 7.—Readjustment of financial conditions is still a serious problem, according to the monthly market report of A. Cameron & Co., Ltd., of Kobe. The Goshi Kaisha Aoki Otagiri Shoten, of Tokio, is understood to have liabilities of about yen 1,500,000 and assets of yen 900,000. When the company first approached its creditors for extensions of time about a month ago, it was believed that liquidation of debts over a period of years was possible, but little progress seems to have been made in this direction. This, says the report, serves as an excellent example of what is occurring in Japan at the moment.

Various reports have reached overseas markets to the effect that certain companies and banks were in financial difficulties during the months of May and June. It has been generally expected that all these more or less bankrupt concerns would be able to readjust their affairs.

Suzuki & Co. serve as another example. They have been more or less bankrupt for about four months and yet none of the creditors have applied to the courts for bankruptcy proceedings against them. There have been several attempts at private liquidation of accounts, by reason of the fact that several of the first-class banks involved are unwilling to expose publicly the exact extent to which they are creditors of Suzuki & Co. The head of Suzuki & Co. is still engaged in efforts to obtain assistance from the Government.

The Fifteenth Bank, contrary to expectations, continues closed and its financial difficulties are evidently much more serious than the public previously believed. In this connection, the attitude of the present Minister of Finance is being commended. He has refused to assist any bank or company which is unable to open its doors without aid, and it is believed that as long as the Government supports this position of the Minister of Finance, progress toward solution of the financial problems will continue.

Crystallography of Cobalt

Crystal lattice determinations on cobalt previously made were not in agreement. Work by Sinkiti Sekito in Professor Honda's laboratory and published in "Science Reports of the Tohoku Imperial University of Japan," June, 1927, indicates that there are two modifications. The low temperature form is hexagonal close packed with lattice constance of 2.498 and axial ratio of 1.622. Transformation occurs on heating at 447 deg. C. into a face centered cubic lattice (constant 3.558), and a reverse change at 403 deg. C. on cooling. These figures agree with the change in length observed at the transformation.

Jugoslavia May Prohibit Imports of Used Machinery

HAMBURG, GERMANY, Sept. 18.—The Jugoslavian Government is considering the prohibiting of imports of second-hand machinery. There is a large trade in used machinery, much of which is of American origin, purchased from German dealers. There is a particularly large business in textile machinery. It is understood that the contemplated restriction of imports is to develop more modern methods of production, as many plants are operating with imported second-hand machines.

Total exports of machinery from Czechoslovakia have slowly dropped off in value from 1924 to date and the prospects for 1927 exports are not so good as they were in 1926, based on the first five months' figures, according to a report received by the Industrial Machinery Division, Department of Commerce, from Acting Commercial Attaché Theodore Pilger, Prague.

FRENCH TARIFF RATES

Our Exports of Iron and Steel to France Under 1 Per Cent of Total Shipments

WASHINGTON, Oct. 4.—As has been stated previously, machinery trade of the United States is affected much more than iron and steel under the Franco-German treaty. The kinds of machinery involved are relatively limited, though the domestic manufacturers in these lines were increasing their markets in France. Such markets will be utterly destroyed, it is claimed, if the maximum rates are applied by France. Metal-working machinery on the whole is not affected much by the new treaty. The amount of trade with France in this line by the United States for 1922-1926, inclusive, was pointed out in *THE IRON AGE* of Sept. 29, page 916. According to the Industrial Machinery Division, Department of Commerce, France absorbed more than \$5,000,000 worth of American machinery for each of the years 1926 and 1925. This amount is estimated to be about 25 per cent of the entire trade with France that is affected by the new tariff.

Tables prepared by J. Joseph W. Palmer of the Department of Commerce show trade in iron and steel products between the United States and France during the first half of 1927 and of 1926. France supplied the United States with 74,528 gross tons, or 12.2 per cent of the imports of 611,504 tons, in 1926 and 63,965 tons, or 16.7 per cent of the 383,932 tons imported, in 1927. The chief products imported from France were cast iron pipe, pig iron, semi-finished steel and steel bars.

Exports of iron and steel from the United States to France in the first half of 1926 amounted to only 6911 tons, or 0.6 per cent of the total of 1,048,620 tons, while in 1927 the amount dwindled to 3131 tons, or 0.3 per cent of the total of 1,131,868 tons. Sheets constituted the chief item, with 5862 tons in 1926 and 2351 tons in 1927, being respectively 85 and 75 per cent of the total American shipments to France. American sheets of 0.50 per cent silicon or more (electrical sheets) are given the maximum duties under the new Franco-German treaty.

STEEL QUOTAS RETAINED

European Entente Reduces Penalty Against Germany for Exceeding Tonnage

WASHINGTON, Oct. 4.—At a meeting on Sept. 26-28 in Luxemburg, the European Steel Entente agreed to retain the same quotas for the last quarter of the present year, the annual basis having been 29,287,000 tons. At the same time it was agreed to reduce to \$1 a ton, from \$2, the penalty against Germany for exceeding its quota in domestic production, the division being 72 per cent for the home market and 28 per cent for export. At one time the penalty was \$4 a ton.

A cablegram received by the Department of Commerce from Acting Commercial Attaché R. C. Miller, Paris, says that Poland remains out of the entente. It had offered Poland an export quota of 300,000 tons, but that country is holding out for 500,000 tons, with no limit placed upon production.

The Sales Comptoir did not go through at the meeting, but another meeting on this subject is to be held on Oct. 19. It is reported that progress has been made toward the setting up of this organization. Belgium is reported to have waived its claim for an increase of 30,000 tons in its export quota, and Germany in turn has agreed to turn over to Belgium 20,000 tons of Germany's quota. In return Belgium has agreed not to export certain of its products, particularly structural steel and semi-finished material, to Germany.

Emile Mayrisch, of Luxemburg, was reelected president of the entente.

The administrative board of the American Engineering Council has been called to meet at York, Pa., on Oct. 20. Sessions will last two days. The president of the council, Dean Dexter S. Kimball, of Cornell University, will preside.

FRANCE ASKS INQUIRY

Low Cost of Production in France Might Affect American Tariff Charges

WASHINGTON, Oct. 3.—The exhaustive French tariff note made public by the State Department today was declared to be not unfavorable to further negotiations. That the negotiations will terminate without friction, however, is by no means assured. The French note in substance strikes at the so-called high tariff duties of the United States, which are claimed to be detrimental to France. It suggests what to the American mind is a unique way of settling the differences between the two countries. The United States is seeking most-favored-nation treatment, to get as low rates as any other country is given by France, in place of the discriminations set up against the United States in the Franco-German treaty.

The French note created surprise in suggesting that, under the flexible provision of the Fordney-McCumber act (Sec. 315), this country might investigate French costs and thus reduce the duties applying to products from that country. The French Government proposed this peculiar plan after stating that it was not a case of bargaining for duties. The French suggestion is looked upon as being in direct opposition to the previous French attitude. As a matter of fact, this provision of the flexible provision has created considerable ill-feeling abroad, a number of Governments having declined the Tariff Commission permission to conduct such an inquiry.

Haiti Reduces Tariff on Wire, Sheets and Other Products

WASHINGTON, Oct. 4.—Barbed wire, nails, knives for commercial and domestic use, insulated copper wire, construction steel and sheet steel are among products which are given reduced import rates as the result of recent approval by the President of Haiti of a law passed by the Council of State, according to the Department of Commerce. Sewing machines operated by motor, brick making machines and bakery machinery are given a new classification. There were no increases on iron and steel products.

British Remove Bessemer Process References from Specifications

In view of the fact that the employment of the basic Bessemer steel process is now no longer in accordance with steel manufacturing practice in the United Kingdom, the British Engineering Standards Association has decided to remove all references to this process from its standard specifications for bull-head railroad rails and flat-bottom railroad rails and, in the current editions of these specifications, slips are being inserted giving the detailed alterations required to the affected clauses.

Industrial Coal Stocks Well Maintained

Stocks of anthracite and bituminous coal in industries of the United States and Canada are reported by the National Association of Purchasing Agents at 58,179,000 net tons on Sept. 1. This is a reduction of less than ½ per cent from the 58,448,000 tons on hand Aug. 1, compared with an average reduction of more than 4,000,000 tons in each of the two preceding months. Consumption during August is placed at 34,506,000 tons, which is 6 per cent above July and about equal to June. Production, however, showed a large gain in August, the excess over July being given as more than 10,000,000 tons.

Based on present rate of use, the stocks Sept. 1 represented 52 days' supply for all industries.

Bituminous mining has gained materially since the first of September, according to a report of the United States Bureau of Mines. The total for the week ended Sept. 24 is given as 9,871,000 net tons—a gain of almost 3 per cent from the preceding week.

FABRICATED STRUCTURAL STEEL

Cuyahoga River Bridge at Cleveland Will Require 18,000 Tons—Awards of 23,900 Tons

Outstanding in the new work pending is a bridge across the Cuyahoga River at Cleveland for the Cleveland Union Terminals Co. which will take 18,000 tons. This project, together with a pipe line near San Francisco, requiring 6000 tons, brought the total of new work to nearly 42,000 tons. Lettings of slightly less than 23,900 tons included no projects of large size. Awards follow:

NEWARK, N. J., 2500 tons, highway bridge, extension of Route No. 1, all bids rejected and new bids to be taken.
SHIPPENSBURG, PA., 175 tons, bridge for Reading Railroad, to Bethlehem Steel Co.
PHILADELPHIA, 1500 tons, building for N. W. Ayer & Son, to McClintic-Marshall Co.
CLEVELAND, 250 tons, building for Grasselli Chemical Co., to Forest City Structural Co.
CHICAGO, 240 tons, building for Devoe & Reynolds Co., to A. Bolters Sons, local.
PEKIN, ILL., 1100 tons, building for Fleischman Co., reported to have been taken by International Iron & Steel Co., Evansville, Ind.
BETHEL, ME., 210 tons, bridge, to Boston Bridge Works, Inc.
THOMASTON, ME., 185 tons, bridge, to Boston Bridge Works, Inc.
STATE OF MAINE, 400 tons, two highway bridges, to Boston Bridge Works, Inc.
BOSTON & MAINE RAILROAD, 325 tons, bridges; 100 tons to Fort Pitt Bridge Works and 225 tons to McClintic-Marshall Co.
MALDEN, MASS., 150 tons, junior high school, to New England Structural Co.
NEW YORK, 4060 tons in the following awards as reported to the Structural Steel Board of Trade: office building on Ryder Avenue, Coney Island; Bracker Memorial at Third Avenue and 183rd Street, apartment building at 122 East Thirty-ninth Street and apartment building at 162 East Seventy-second Street, to Levering & Garrigues Co.; bank and office building at Jamaica Avenue and 160th Street in Jamaica and garage at 623 West Fifty-seventh Street, to George A. Just Co.; power house for Long Island Light & Power Co. at Glenwood, L. I., to Lehigh Structural Steel Co.
NEW YORK, 200 tons, Publishers' Building on West Fifty-second Street, to Harris Structural Steel Co.
MASPETH, N. Y., 400 tons, factory building, to American Bridge Co.
BALTIMORE, 575 tons, Fairfield Farms dairy building, to Deltrich Brothers.
WASHINGTON, 200 tons, building for Bureau of Standards, to Lehigh Structural Steel Co.
JOHNSON CITY, N. Y., 270 tons, high school, to Jones & Laughlin Steel Corporation.
PITTSBURGH, 200 tons, miscellaneous work, to Pittsburgh Bridge & Iron Co.
YORK, PA., 470 tons, plant for Sandusky Cement Co., to Pittsburgh Structural Steel Co.
CLEVELAND, 1300 tons, Union Terminals Co., Eagle Avenue bridge, to McClintic-Marshall Co.
PERE MARQUETTE RAILROAD, 100 tons, for Joseph Campau

grade crossing elimination, Detroit, to McClintic-Marshall Co.

DAYTON, OHIO, 168 tons, G. W. Shroyer Building, to Massillon Bridge & Structural Co.
BIRMINGHAM, 335 tons, Tutwiler Estate garage, to Virginia Bridge & Iron Co.
CHICAGO, 123 tons, Englewood Masonic Temple, to American Bridge Co.
CHICAGO, 2000 tons, hotel at 5000 East End Avenue, to Duffin Iron Co.
MILWAUKEE, 1700 tons, city section of Milwaukee County Safety Building, to S. M. Siesel Co., local.
EAST ST. LOUIS, ILL., 200 tons, General Chemical Building, to Missouri Bridge & Iron Co.
KANSAS CITY, MO., 275 tons, switch house for Harry L. Daugherty Co., to Kansas City Structural Steel Co.
LOS ANGELES, 2800 tons, addition to Biltmore Hotel, to Llewellyn Iron Works.
LOS ANGELES, 850 tons, plates for penstock Southern California Edison Co., Big Creek plant, to Western Iron Works.
DECOTO, CAL., 375 tons, Masonic Hospital, to Golden Gate Iron Works.
OAKLAND, CAL., 100 tons, technical high school gymnasium, to Moore Drydock Co.
SAN JOSE, CAL., 150 tons, apartment, to Golden Gate Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 350 tons, Edison Electric Illuminating Co. of Boston, substation on Hawkins Street.
PITTSFIELD, MASS., 125 tons, Boston & Maine Railroad Co. bridge.
NEW YORK, 2000 tons, French Hospital, Eighth Avenue and Thirtieth Street.
BROOKLYN, 600 tons, St. Lawrence University Law School.
KEARNY, N. J., 700 tons, building for Western Electric Co.
STATE OF NEW JERSEY, 225 tons, highway bridges.
SAYRE, PA., 100 tons, high school.
WILMINGTON, DEL., 300 tons, telephone building.
BALTIMORE & OHIO RAILROAD, 375 tons, bridge at Cincinnati.
SAVANNAH, GA., 500 tons, building for Southern Bell Telephone Co.
OLD HICKORY, TENN., 1300 tons, factory building for Dupont company.
DETROIT, 500 tons, addition to Kern Co. store.
CHICAGO, 2000 tons, Lawyers' Building.
CLEVELAND, 18,000 tons, Cleveland Union Terminals Co. for railroad bridge over Cuyahoga River; bids to be taken Oct. 31.
CHICAGO, 2400 tons, open-hearth building for Wisconsin Steel Co.
CHICAGO, 1100 tons, apartment building at 1430 Lake Shore Drive.
STATE OF TEXAS, 800 tons, highway bridge.
LOS ANGELES, 1800 tons, building for Foreman & Clark Clothing Co.
SEATTLE, WASH., 2100 tons, two bridges for Simpson Logging Co.
SAN FRANCISCO, 6000 tons, pipe line for Spring Valley Water Co., bids being received.
SAN FRANCISCO, 675 tons, amusement park at beach; bids being received.

NEW USE FOR CHROMIUM PLATE

Oil Stills Made to Last Longer by a Unique Application of the Art

AN application of chromium plating of large importance and industrial significance has recently been put into operation in California. At some of the large oil refineries, steel stills of varying dimensions are used for cracking operations in producing gasoline and other products. Some of these stills are produced by the A. O. Smith Corporation, Milwaukee, and are in themselves unusual products. They are understood to vary from 3 to 6 ft. in diameter, with some of them as long as 22 ft., and to be made of steel plate 3 in. thick, welded electrically. In the distilling operations, they must stand very high temperatures and high pressures. After they have been in use for some time, the thickness of the stills gradually lessens from corrosion until a point is reached where, for obvious reasons, the pressure must be reduced and consequently the output of gasoline and other products lessened. It is understood that this occurs when the stills reach a thickness of about 1½ in.

It is at this stage of the proceedings that chromium plating has stepped in. A number of stills, which had been reduced in thickness to about 1½ in., have been successfully plated inside with chromium and their life has been decidedly increased. The plating is accomplished by partly filling the still with the electrolyte, then introducing electrodes and revolving the still during the plating. Experience thus far has demonstrated that the cost of chromium plating is more than offset by the increased life of the still and the fact that the pressure does not have to be lessened and, therefore, the product of the still is not diminished.

The understanding is that it will be possible in the near future to make the original stills of a thickness considerably less than 3 in., which will be chromium plated and used in that condition at once. This is expected to result in a less expensive still with a considerably longer life. It is also stated that the carbon deposits from the cracking operations are more easily detached from the chromium plated steel than from the ordinary steel surface.

Those who are interested in this new development emphasize that the field is a wide one and are making plans to apply the chromium plating on a large scale.

CONTENTS

October 6, 1927

Conveyor System Doubles Capacity	933
Making Sponge Iron in Japan.....	937
All-Metal Airplane Fuselages.....	939
Testing Engineers in Holland.....	941
Limitations of Structural Welding	943
British Steel Men View American Prosperity	947
Foundry Problems Discussed in Paris	960
September Iron Output Lowest of Year.....	972

British Steels at London Engineering Exposition	936
National Census of Distribution.....	938
Organization of Bureau of Standards...	938
Hudson Valley Furnace to Blow Out...	938
New Minerals Division in Department of Commerce	946
Changes in Machine Tool Production...	949
Development of the Locomotive Shown.	950
Metal Companies' Exhibits at Chemical Show	953
Heat of Transformation of Nickel and Cobalt	959
French Tariff Rates.....	964
Steel Quotas Retained.....	964
New Use for Chromium Plate.....	965
Hanna Buys Rogers-Brown Furnaces...	970
Super-Power for Soviet Steel Plants...	971
Low Bidders on Hudson River Bridge..	973
A Year's Research in Steel.....	994
Institute Directors' Tribute to Gary ..	994
Building Permits in 1926.....	994
New Trade Publications.....	1002

STATISTICAL

Industrial Coal Stocks Maintained.....	964
--	-----

MEETINGS

International Congress for Testing Ma- terials	941
Institute of Steel Construction to Meet..	946
Iron and Steel Institute (British).....	947
Society of Automotive Engineers.....	952
International Foundry Congress.....	960
American Iron and Steel Institute.....	993

NEW EQUIPMENT

Improves Line of Planers.....	954
High-Speed Surface Grinding Attachment	954
Cutting-Off Machine for Bar Stock.....	955
Electrically Controlled Automatic Clean- ing and Pickling Machine.....	955
Automatic Machine for Welding Rings..	956
Diesel-Driven Power Unit	956
Abrasive Band and Disk Grinder.....	956
Heavy-Duty Face Grinder.....	957
Electric Truck for Handling Tin Plate.	957
Heavy-Duty Roller Pipe Cutter.....	958
Heavy-Duty Ball Bearing Center.....	958
Jig Spacer for Vertical Millers.....	958
Combination Shear, Punch and Coper...	959
Portable Motor-Driven Hacksaw.....	959

DEPARTMENTS

European Steel Markets.....	962
Structural Awards and Projects.....	965
Editorial	968
Iron and Steel Markets.....	974
Comparison of Prices	975
Prices, Raw and Finished Products..	977-979
Non-Ferrous Metals	991
Railroad Equipment Buying.....	992
Reinforcing Steel Business.....	992
Personals	993
Obituary	994
Machinery Markets	995

This Issue in Brief

Field welding is more expensive than riveting, says construction engineer. Unless there is an inherent advantage to overbalance the extra cost, welding is not justified, says Joseph Matte, Jr.—Page 943. But when structural material can be shipped direct from mill to job, avoiding the structural shop altogether, the economies more than offset the high cost of field welding, steel company executive declares.—Page 944.

High-chrome steels are valuable for use where strength is required at high temperatures, as in the case of boilers operating at high pressures and temperatures. However, the high cost of this steel prevents its general adoption, except for smaller parts, a steel with 1.55 per cent manganese being used instead.—Page 941.

Fatigue failure of metals is not preceded by crystallization. Repeated stress in some metals does not change the structure from fibrous to crystalline, as previously supposed, but rather causes a slip along intracrystalline planes. There is probably a limiting stress below which no fatigue cracks will form, even under an indefinite number of stresses.—Page 941.

Stresses importance of "procedure control" in welding. Where this has been completely followed, no welded joint has ever failed, says S. W. Miller. Procedure control involves proper testing of operators, selection of material to be welded, design of welded joint, application of correct welding technique, and suitable testing of finished weld.—Page 945.

Ideal quenching temperature for hardening carbon steel is indicated by magnetic device. The best hardening results are obtained if steel (not below 0.40 per cent carbon) is quenched at that temperature at which all magnetism disappears. Newly invented resistance furnace is equipped with a magnetic indicator.—Page 936.

In welding heat-treated aluminum alloys a welding wire containing 5 per cent silicon is found desirable. It melts at a lower temperature than the pieces being joined, has a low contraction on solidification, and readily absorbs temperature strains.—Page 940.

Phosphorus in cast iron reduces its ability to resist wear. Foreign metallurgist's investigation reveals that high phosphorus destroys wear resistance.—Page 942.

Uses annealing boxes from two to five years at 2000 deg. Fahr. One of the best alloys for annealing boxes is iron 17 per cent, nickel 50, and chromium 33, metallurgist declares.—Page 942.

Sponge iron can be made for \$10.50 a ton, Japanese asserts. The ore is beach sand, of which over 200 million tons is available. The claim is made that the sponge iron can be sold for \$19 to \$20 per ton, but steel mills are reluctant to pay as much for it as for pig iron.—Page 937.

The secret of American prosperity lies in recognition of the fact that low costs make for high wages, says British steel manufacturer. Reduction of costs reduces the standard of commodity prices and increases the standard of living, a fact frequently forgotten in British labor circles.—Page 947.

Hardens steel gears by immersing them partly in water and heating exposed portion by an oxyacetylene blow pipe. The heating is followed by a jet of cooling water. The gear is mounted on a spindle and turned mechanically. A hard wearing surface is produced without distorting the gear.—Page 936.

Rewelding of a sound welded joint in steel tubing reduces the strength of the joint to 60 per cent of the original. Repair welding over brazed or soldered joints should be prohibited.—Page 940.

Conveying system enables furnace manufacturer to double output with reduced floor space. Elimination of manual handling also results in lower labor costs.—page 933.

Distribution census may be made in 1930, says Hoover. Will provide data on consumption for the guidance of manufacturers in regulating production, so as to prevent glutting of markets, with resulting business slumps.—Page 938.

Pig iron output lowest in two years. September daily rate of production was 92,498 gross tons, a loss of 2575 tons, or 2.7 per cent, from August. On Oct. 1 the number of furnaces in blast was 179, which was 9 under the Sept. 1 figure.—Page 972.

Look to the nations of North and South America for future export markets. The highly developed European countries will be quick to supply their own needs, and those of Asia and Africa. Our logical markets lie on the western continents, with vast potentialities for export trade to be developed in those nations south of the Rio Grande.—Page 970.

"Steel demand grows while it sleeps." Hand-to-mouth buying, with consequent small backlogs, may cause steel producers to lose sight of the fact that demand is steadily growing, even while it seems to halt. Even with the unimpressive evidence of industrial activity in the first nine months of 1927, we have produced about as much steel as was made in the same period of 1923.—Page 968.

Destroying the paint on structural steel in welding is not a factor of consequence. American Bridge Co. specifies that no painting shall be done before riveting, since that company has found it very difficult to drive rivets which will stay tight in members carrying vibrating loads if the overlapping parts have been previously painted.—Page 944.

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Growth In Steel Demand

IN the old days of wide fluctuations in steel buying it used to be remarked very aptly that "steel demand grows while it sleeps." After each halt in buying, a new movement carried the steel tonnage to a much greater height than had previously been seen. The country had been growing while there was little expression of demand in actual buying, new uses had been developing. The long range rate of increase was relatively steady.

Nowadays, while it is not so well recognized, we have much the same thing in different form. Buying, being of the much mentioned "hand-to-mouth" character, not only on the part of steel manufacturing consumers themselves, but on the part in turn of their customers, is steadier in the total, and the month-to-month swings are relatively small. It is harder to make new records, because what used to be troughs have been quite largely leveled up.

The sum total of steel demand in the past three months does not run greatly below that in the same period of last year; yet conspicuous cases of large decreases can be picked out, involving the automobile trade, the railroads and the oil and gas fields. It might be said that these decreases explain too much, which means that there has not been a like falling off all along the line. Given the same general or basic conditions as existed a year ago, there would be a larger total of demand, even after the lapse of only one year.

Making a longer range comparison, we have produced approximately as much steel in the first nine months of this year as was made in the first nine months of 1923; yet the evidence of industrial activity has been much less impressive than four years ago. The general basis of steel demand has been rising or the showing would not be so favorable as it is. The mere comparison of tonnage, moreover, does not cover the whole ground, for, due to better quality, steel ton for ton is rendering more service. Whether the steel makers are securing financial returns commensurate with the increasing service rendered is a matter that calls

for searching inquiry. As we have pointed out heretofore, in writing of another phase of the subject, steel manufacturers were so long used to gaging the situation by the size of their backlogs that they still fail to appreciate that steel demand has not lost its old habit of growing while it seems to halt.

"Jerry-Builders" Among the Welders

EVIDENCE continues to accumulate about the strength and reliability of the welded joint when properly made. Summaries of five years' investigations given to the Detroit meeting of the American Welding Society by one of the testing engineers in the Army Air Service are particularly impressive. He says that welds are as uniform as the tubing, probably meaning thereby that there is as much danger of incorporating a plain steel tube into a fuselage by mistake, in place of a high-strength alloy tube as there is of a poor joint being made and later accepted by the inspector. Further, to indicate how small this chance really is, he stated that "welded structures have been used for over five years on every type of military airplane and there has not been a failure in service of a properly designed and properly manufactured welded joint."

It is well to remember that this last phrase "proper design and proper manufacture" is a most important qualification, too often slighted in practice. Only with this proviso in mind can one accept a statement made by a past president of the welding society, that "procedure control welding has never failed." He means that if proper attention is given to the selection of workmen and the material, if a correct design is prepared and if the weld is made with proper equipment under adequate inspection and finally given a proof test, then satisfactory service will follow.

For that matter, the same may be said of any manufacturing process. If and when a failure actually does occur (and casualty insurance companies' repair gangs and wrecking crews exist

because we know that failures will sometimes occur) then it can be assumed that some essential in engineering or manufacturing procedure has been overlooked. Progress comes when such failures are closely studied to determine just where the error occurred, and the specifications are revised accordingly.

Leaders in the welding field have been forced to study these matters intensively, for they are endeavoring to accumulate within a decade information which has been gathered in competing lines during a long period of years. They are to be congratulated on the degree of success they have already achieved, as measured by the above quotations. It would be unwise, however, to assume that nothing but the best possible work is being done and refuse to see the great amount of second and third-rate welding on the market—just good enough to get by. For instance, much oil tankage is being made with the scantiest beads run around the lap joints; furthermore, it is sold with the assurance that it will be satisfactory and is buried underground. One wonders how such tanks survive the rough handling during shipment and will wonder still more if they do not cause large leakage losses before many years. Again, machine parts are often “stuck” together with rough, lumpy, porous stuff which inspires anything but confidence in the strength and reliability of the joint, not worthy of the name “weld.”

The jerry-builder who makes it just good enough to get by is a nuisance and source of danger to any industry. He is no less an impediment to the commercial acceptance of the welding art. Until his potentialities for danger are much reduced, the conscientious welders will find many restrictions (which they will feel are unduly repressive) thrown about their activities by codes and regulations and by conservative men generally.

Manufacturers and Child Labor

THROUGH its Junior Education and Employment Committee, the National Association of Manufacturers is attacking the problem of child labor with the purpose of extending protection to children between the ages of 14 and 16 into such States as have lagged in this class of legislation. A few years ago the attempt was made to correct existing evils by a Federal constitutional amendment, but the country rejected it, not because of indifference to the welfare of young children, but because of the belief that Federal control of affairs within States had gone as far as it should go.

The committee of the National Association of Manufacturers has approached the subject in a very different way. It will strive to promulgate a sane and in no sense radical program, not through Federal compulsion, but by means of a campaign of education, which it is hoped will appeal to employers as well as to State legislatures. The committee is a small one, but strongly constituted. The metal industries are well represented by President E. M. Herr of the Westinghouse Electric & Mfg. Co. and W. A. Viall of the Brown & Sharpe Mfg. Co. The committee will seek the cooperation of State and local organizations, universities and colleges, and of individual educators.

In many States, particularly in most of those of

the northeastern United States, practically everything recommended by the committee is already written into the statutes. Other States have done comparatively little. The program requires that a child have an employment certificate and a certificate of physical fitness; that all children must first complete the sixth grade of school, excepting when released because they are unable to profit by further education; that all children under employment must have at least four hours a week of continued education; that the hours of labor shall not exceed 48 hours a week, with no labor after 9 p.m. or before 7 a.m.; and that no child shall be employed in hazardous occupation.

Supplementing the requirements outlined above, the program gives a general scheme of child education, comprising vocational as well as common schools, the training of teachers and the like. It is a simple plan, containing none of the pedagogic quirks often found in educational proposals, and it would seem that the committee has sought for the best that established good practice could give it.

Coal Miners Enjoined

THE Pittsburgh Terminal Coal Corporation has won its case against the United Mine Workers, the United States District Court sitting at Pittsburgh having granted the injunction on practically all counts. The eviction matter was omitted, the appeals in the case coming up in Philadelphia this week, while the separate claim for \$1,500,000 pecuniary damages was left for later consideration.

The decision is regarded as of epochal importance, but really it should not be, except on the ground that such matters should have been settled long ago beyond peradventure of doubt. It was not sought to enjoin the miners from striking, but to enjoin them from intimidation and violence.

Before the bar of public opinion the opposition of the United Mine Workers to the granting of the injunction may well be regarded as resting upon a technicality. Their claim was that since their activities were directed against coal being mined and not against coal in interstate commerce, the Sherman law did not apply. But if the Sherman law is a proper one as a Federal law, it would be equally right for the individual States to have such a law. In his authoritative work on the Sherman law the present Chief Justice traced the principle from its inception in the common law of England, before there was any United States of America. England did not have separate states. It is an incident that we have. If so much business did not fall in the category of interstate commerce it may well be thought that long ago Sherman laws would have been enacted by many or all of the individual States.

The feelings of the people as to how strikers should conduct themselves are to some extent a matter of geography. Intimidation and violence are not countenanced when they occur at home. When they occur in mining towns they are regarded by many as merely characteristic. Nearly every community thinks it is among the most civilized of all. This method of conducting coal strikes has persisted because coal mining is remote. Violence as a strike weapon is an anachronism and it is yielding before public opinion as well as before legal decisions such as the important one just rendered. It is idle to assert that such conduct is necessary

to enable coal miners to earn a living. It is not a peculiarity of coal mining; it is a recourse of coal miners, who do not want to go into other occupations and who do like to engage in strikes.

A Better View of Latin-America

IT is almost self-evident that the great and enduring opportunity for foreign trade in metals and machinery lies with the other nations in North and South America. Exports to Europe may bulk large at times, due to our ability to make machines for certain purposes, but those highly developed countries will be quick to provide their own special needs. Asia and Africa have large backward areas, but nearly all of them are under the protecting wing or actually subject to some industrial nation, east or west of us.

North and South America alone remain, each containing vast potentialities. What may be ultimately expected is dimly shadowed forth by Canada, our nearest neighbor in every respect, and our best customer. We understand Canada. We can speak their English, and appreciate the difficulties and advantages under which they live. They understand our eccentricities, and endure them when they must. Relations are friendly. Trade in both directions is large and profitable.

We can do the same with all the nations south of the Rio Grande when we reach a similar plane of mutual understanding. Unfortunately many mistakes have been made in past years by our official representatives; thousands more have been contained in uninformed and boorish articles in American newspapers and magazines. Enough has been translated and circulated to give our southern neighbors the idea that we consider ourselves vastly superior in manners, morals, education, culture, and material development, and will domineer if given half a chance.

But signs multiply that our State Department has turned over a new leaf, and it is to be hoped that the publicity vendors will follow the same cue. The appointment of Dwight W. Morrow to be Ambassador to Mexico is recognition of the fact that this is a most important post, for which the best available man is none too good. Last week President Calles and President Coolidge opened a Wash-

ington to Mexico City telephone service by an interchange of friendly greetings, spoken over the wire. All our ambassadors to Pan America have been notified to gather at Havana in January, to attend the Sixth International Conference of American States. The second President of the United States to leave our soil during his term of office will journey to Cuba to bear a message of good will to this gathering. Lastly, much semi-official talk has been printed concerning air mails linking the two continents. It appears to be entirely possible, and may be established within a year. President Coolidge is also taking an interest in a great north-and-south highway, linking Canada with Argentina and Chile.

All these developments, reported in recent days, may be taken as indications of a new effort at Washington to emphasize our desire for friendly relations with the nations south of us. It will doubtless meet with rebuffs, but if persisted in cannot help but bring a change in mental attitude, not only in the United States, but in all the American States. This friendliness is the first essential for building that foreign trade which perhaps we do not need so badly today, but which will be most essential for our continued development in years to come.

EVEN a study of statistics does not give an adequate idea of the importance of American ferro-alloy manufacture—an industry which in the last 20 or 25 years has made remarkable progress. While the production of ferroalloys in American furnaces was not a record in 1926, its diversity emphasizes some marked trends. At 674,312 gross tons, according to the American Iron and Steel Institute, the 1926 output was the largest since the war, with the exception of the 682,000 tons of 1920. A feature has been the expansion in ferrosilicon, which at 245,605 tons established a new peace-time record, due in part to larger basic steel production and to demand for special steels. Ferromanganese production last year at 318,900 tons was also a record apart from war years, and the figure indicates our greater independence of foreign producers. Of "other ferroalloys"—principally ferrochromium—last year's total was 33,600 tons. While not a record, the figure is 235 times that of 20 years ago—a proof of the notable expansion in alloy steels.

M. A. Hanna Co. Buys Rogers-Brown Furnaces

The blast furnaces and other assets of the Rogers-Brown Iron Co., Buffalo, were purchased by the M. A. Hanna Co., Cleveland, Sept. 29, at the close of a two days' hearing of creditors conducted by the referee in bankruptcy. The hearing and sale followed a voluntary petition in bankruptcy filed by the Rogers-Brown company a few days previously.

The Hanna company acquired the property on a bid of \$1,500,000, of which \$750,000 was for fixed assets. The latter were bought subject to prior liens. The balance was for accounts, inventories, etc.

Although the amount realized on the sale will not net the company's general and refunding 7 per cent bondholders more than 35 per cent of the par value of their bonds, the protective committee for these bondholders has obtained an extension for an additional 60 days of the offer of 40 per cent so that bondholders will be able to obtain the larger amount by the immediate deposit of their bonds with the committee.

The Hanna company has acquired by its purchase the four blast furnaces heretofore operated by the Rogers-Brown Iron Co. at Buffalo, which have a total capacity of 500,000 tons per annum. The Hanna company has three furnaces in Buffalo, and the combined capacity of its seven Buffalo stacks will be 850,000 tons per annum. In addition to these blast furnaces, the Hanna company owns a 50 per cent interest in the Donner-Hanna Coke Corporation, Buffalo.

The Rogers-Brown properties included the Rogers and Hiawatha iron mines in the Iron River district in Michigan. These have been operated by the Munro Iron Mining Co., of which the Rogers-Brown company owned the entire stock. The Hanna company has acquired the Munro company and the two mines by securing among the assets all the stock in the Munro company. For some time the Hanna company has been sales agent for the ore from these mines.

The Rogers-Brown furnaces were turned over to the Hanna company immediately after the sale and are being operated under the direction of B. Marron, who for some years has been superintendent of the Hanna furnaces in Buffalo.

Super-Power for Soviet Steel Plants

Program for Development of South Russian Iron and Steel Industry Tied Up With Construction of Hydroelectric Works

"THE steel industry of southern Russia will be coordinated with a super-power system," said Prof. Ivan Alexandrow, author of a project on the Dnieper River, in an interview with a representative of THE IRON AGE. Professor Alexandrow, who has been in this country for some weeks, studying power stations with a view to ascertaining the best practices in design and equipment, sailed for home last week.

The Russian plans call for the erection at Saporozhie on the Dnieper River of a hydroelectric plant in three stages, the first of which will have 350,000 installed horsepower in seven units, the second 750,000 hp., and the third 1,200,000 hp. It is estimated that electric energy will be generated at a cost of 0.3c. per kw-hr. To supplement the power from this plant in low-water periods standby steam stations will be provided in the Donetz coal basin. One of these, now in operation in the anthracite field of that basin, has a capacity of 20,000 kw., but will be enlarged to develop 60,000 kw. Another steam station, with a capacity of 80,000 kw., will be built at Grishno.

This system will supply power to the coal and iron mines and steel plants, as well as to all other industries in southern Russia. The importance of the power development may be appreciated when it is realized that south Russia contains 80 per cent of the metal industries and 70 per cent of the coal mining operations of the entire country, including its Asiatic territory.

Near the hydroelectric plant is a manganese ore deposit which is estimated to contain 50,000,000 tons. The ore, which assays about 50 per cent manganese, is as rich as that in Georgia but is adapted best for electric smelting. It is planned, therefore, to build electric furnaces at Saporozhie for the production of ferromanganese, as well as various grades of ferrosilicon. Here also will be centered plants for the manufacture of the best quality of steels, including alloy steel, high-carbon steel, high-speed tool steel and fine rolling steels. Copper and aluminum will be electrically refined, and tungsten wire will be made.

At Krivoy Rog, 100 miles west of Saporozhie, iron and steel castings will be made, as well as a small quantity of rolled steel. Krivoy Rog is located near a deposit of 60 per cent hematite iron ore having estimated reserves of 1,000,000,000 tons. This deposit is to be connected with the Donetz coal fields by an east-west railroad super-trunk line having a maximum gradient of 0.004 deg. and a minimum radius on its curves of more than 1000 meters (3281 ft.).

The Donetz Basin contains large deposits of anthracite and bituminous coal of good coking quality. The coal reserves are estimated at 1.10 trillions of tons, of which 70 per cent is anthracite and 30 per cent bituminous.

Southern Russia is rich, also, in dolomite and limestone, both of which are essential materials in the iron and steel industry. Near the site of the hydroelectric plant are important deposits of kaolin which will be utilized, it is planned, to build up a porcelain industry.

Coordinated with the plans for a super-power system and a connecting trunk line is a program for the construction of more blast furnaces. There are now in operation 11 steel plants in south Russia—five in the Donetz Basin, one at Mariupol, one at Taganrog on the Sea of Asov, two in the Ekaterinslav district, one at Krivoy Rog and one at Kerch in the Crimea.

Four new plants are planned, of which one at Kerch is now under construction. The other three are to be located at Krivoy Rog, Saporozhie and in the Donetz Basin respectively. Kerch is situated in a soft brown ore deposit estimated as containing 4,500,000,000 tons. This ore is high in phosphorus, with some arsenic, and contains 35 per cent iron. Notwithstanding its low

quality the ore is cheap, being removed from open pit mines at a cost of 50c. a ton.

The new plants will have a capacity of 1,000,000 tons per year each, or 2700 tons per day. In addition to those in south Russia, two steel plants are to be built in the Ural Mountains and one in the Kusnetzky Basin in Siberia.

The construction of these plants, with the exception of those at Kerch now being built, will be begun in 1928. The laying out of blast furnaces, as well as steel plants, is under the direction of the Project Bureau of the Soviet Government. On all of the work except the building of the Kerch plant the Freyn Engineering Co., Chicago, will act as consultant. The American engineering firm will also make recommendations for the purchase of equipment, although the final decision as to the placing of orders will rest with the Project Bureau. Engineers of the bureau plan to visit this country to inspect typical American plants and to study American equipment.

Professor Alexandrow, whose duties pertain particularly to the power project, states that the Saporozhie dam will be 140 ft. high from foundation to the top of the masonry and will have a 121-ft. head of water. It will have a lock with three chambers to permit the passage of vessels. Both navigation and irrigation are tied up with the project. Plans for irrigation cover the semi-arid coastal region near the mouth of the Dnieper River.

Soviet to Make Large Expenditures on Metal Industries in Coming Year

Saul G. Bron, chairman of the board Amtorg Trading Corporation, New York, the principal organization in Soviet-American trade, has given out the following:

"With a new fiscal year beginning in the Soviet union Oct. 1, we are advised that provisions have been made by the Soviet Government for the expenditure of 1,183,990,000 rubles (\$609,754,840) for capital improvements in industry during the next 12 months. This is about 19 per cent more than similar expenditures during the fiscal year 1926-27. More than one-fourth of the allotted amount will go for the construction of new plants. The above figures do not include appropriations of \$75,000,000 for new power plants.

"These not inconsiderable capital investments are bound to give a considerable impetus to American-Soviet trade, already twice as large as before the war. American equipment—and coincidentally American technicians—must figure largely in the industrial expansion of the Soviet union. During the past fiscal year the Amtorg Trading Corporation purchased equipment here valued at over \$25,000,000, an increase of 60 per cent over the previous year.

"The purely reconstructive phase of development in the Soviet union has now definitely been passed. During the past year industrial production exceeded the pre-war rate, showing a gain of about 20 per cent over 1925-26. Only the metal and ore mining industries are still below the pre-war level. Of the capital investments allotted for the new fiscal year, \$172,210,850 will go to the metal industries, \$165,366,500 to the fuel industries, \$101,182,050 to the textile industry.

"It is safe to predict that for some years foreign technicians will be employed increasingly in connection with industrial expansion and the development of natural resources in the Soviet union. The present rate of expansion is making demands beyond the supply of native technical ability. The Soviet union is not lacking in men of the highest engineering skill, but in large projects new to the country, such as the major hydroelectric developments, experienced foreign engineers with the practical 'know how' will be in demand."

September Iron Output Lowest for Year

Decline in Daily Rate Was 2575 Tons or 2.7 Per Cent from August—Net Loss of 8 Furnaces

A RATHER sharp decrease in pig iron production was recorded in September. The rate fell to 92,498 gross tons per day, a decrease from August of 2575 tons or 2.7 per cent. This contrasts with a decline in August from July of only 126 tons per day. The September falling off is the sixth month in succession, the first having been in April. The September daily rate of 92,498 tons is the smallest since September, 1925, when it was 90,873 tons per day.

September's total output of coke pig iron was 2,774,949 tons or 92,498 tons per day, against 2,947,276 tons or 95,073 tons per day in August, a 31-day month, as contrasted with the 30 days in September. The decline last month of 2575 tons per day compares with 126 tons in August, with 7789 tons in July, and with 6397 tons per day in June. The check in the falling off, possibly indicated in August, did not materialize. A year ago the September daily rate was 104,543 tons, and an upward trend then appeared.

Net Loss of Eight Furnaces

Furnaces shut down totaled 11, with 3 blown in—a net loss for the month of 8. This compares with a

net loss of 3 in August, of 8 in July, of 13 in June, of 9 in May and of 3 in April. March showed a net gain of 6 furnaces.

Of the 11 furnaces shut down last month, 4 were Steel Corporation stacks, 3 belonged to independent steel companies and 4 were merchant. The 3 furnaces

Coke Furnaces in Blast

Furnaces	Total Stacks	In Blast	Oct. 1 Capacity per Day	In Blast	Sept. 1 Capacity per Day
New York:					
Buffalo	21	14	6,490	13	5,790
Other N. Y. and Mass.	6	3	1,155	3	1,190
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	11	5	2,090	6	2,370
Spiegeleisen	2	1	175	2	295
Schuylkill Valley ...	12	5	1,940	4	1,415
Susquehanna Valley..	4	2	945	2	860
Ferromanganese ..	1	1	65	1	70
Lebanon Valley	0	0	....	0	....
Ferromanganese ..	2	0	....	0	....
Pittsburgh District..	52	28	17,770	30	18,575
Ferro. and Spiegel ..	4	2	340	2	340
Shenango Valley ...	13	5	2,540	5	2,425
Western Pennsylvania	18	6	2,840	6	3,130
Ferromanganese ..	2	1	215	1	220
Maryland	5	5	1,890	5	2,160
Ferromanganese ..	1	0	....	0	....
Wheeling District ...	13	6	3,670	7	4,000
Ohio:					
Mahoning Valley ...	26	13	8,125	14	8,350
Central and Northern	23	18	10,370	18	10,570
Southern	13	3	855	3	875
Illinois and Indiana...	44	28	17,790	28	18,170
Mich., Wis. and Minn..	12	6	2,300	7	2,975
Colo., Mo. and Utah...	7	4	1,525	4	1,700
The South:					
Virginia	14	1	240	1	240
Ferromanganese ..	1	0	....	0	....
Kentucky	5	1	350	2	680
Alabama	34	18	6,800	19	6,975
Ferromanganese ..	1	1	60	1	60
Tennessee	12	2	260	3	365
Total	362	179	90,800	187	93,800

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
September, 1926	81,224	23,319	104,543
October	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073
September	69,673	22,825	92,498

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Sept. (30 days)	Aug. (31 days)	July (31 days)	June (30 days)
New York and Mass.	222,485	231,625	226,700	216,194
Lehigh Valley	86,398	88,451	84,429	84,888
Schuylkill Valley...	52,256	37,284	52,510	58,224
Lower Susq. and Lebanon Valleys..	30,349	31,244	27,173	30,300
Pittsburgh district..	555,384	580,459	534,610	573,967
Shenango Valley...	83,919	98,687	105,136	118,233
Western Penna. ...	91,774	96,833	97,399	98,676
Maryland, Virginia and Kentucky....	80,973	95,528	96,070	96,676
Wheeling district...	114,357	130,065	136,265	136,251
Mahoning Valley...	248,834	265,726	263,456	272,834
Central and North- ern Ohio	311,141	327,703	340,306	340,810
Southern Ohio	25,636	27,046	32,479	41,828
Illinois and Indiana	533,686	572,623	587,755	649,019
Mich., Minn., Mo. and Wis., Colo. and Utah	122,309	140,069	146,938	140,507
Alabama	207,363	212,337	208,739	220,230
Tennessee	8,085	11,596	11,195	11,514
Total	2,774,949	2,947,276	2,951,160	3,089,651

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1923—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84,358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year....	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	95,199
Aug.	111,274	60,875	87,241	103,241	95,073
Sept.	104,184	68,442	90,873	104,543	92,498
Oct.	101,586	79,907	97,528	107,553	....
Nov.	96,476	83,656	100,767	107,890	....
Dec.	94,225	95,539	104,853	99,712	....
Year	109,713	85,075	99,735	107,043	....

Production of Steel Companies for Own Use—Gross Tons

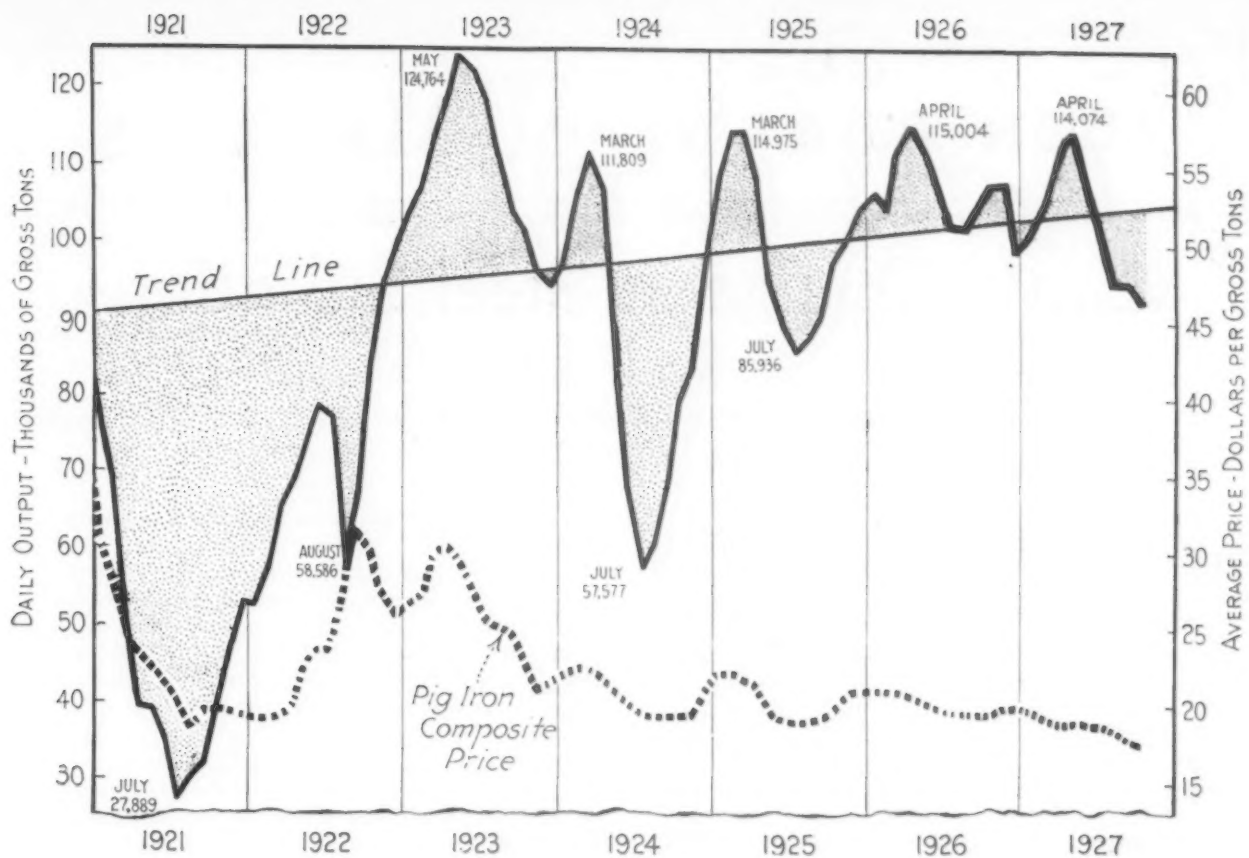
	Total Iron Spiegel and Ferro	1926	1927	Fe-Mn Spiegel	Fe-Mn Spiegel	1926	1927
Jan. ...	2,599,876	2,343,881	29,129	7,746	31,844	7,486	7,486
Feb. ...	2,272,150	2,256,651	22,309	7,084	24,560	7,045	7,045
Mar. ...	2,661,092	2,675,417	24,064	7,339	27,834	7,650	7,650
Apr. ...	2,677,094	2,637,919	24,134	7,051	24,735	12,907	12,907
May ...	2,687,138	2,619,078	23,159	6,999	28,734	9,788	9,788
June ...	2,465,583	2,343,409	25,378	5,864	29,232	10,535	10,535
½ year..	15,362,933	14,876,355	148,173	42,083	166,939	55,411	55,411
July ...	2,461,161	2,163,101	26,877	3,699	26,394	9,350	9,350
Aug. ...	2,424,687	2,213,815	23,557	4,372	21,279	9,104	9,104
Sept. ...	2,436,733	2,090,200	25,218	2,925	20,675	6,037	6,037
Oct. ...	2,578,830	....	28,473	6,295	....	....	....
Nov. ...	2,484,620	....	31,903	7,565	....	....	....
Dec. ...	2,322,180	....	31,627	7,157	....	....	....
Year..	30,071,144	....	315,828	74,096	....	....	....

*Includes output of merchant furnaces.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1925—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,930,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year....	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	2,951,160
Aug.	2,704,476	3,200,479	2,947,276
Sept.	2,726,198	3,136,293	2,774,949
Oct.	3,023,370	3,334,132	....
Nov.	3,023,006	3,236,707	....
Dec.	3,250,448	3,091,060	....
Year*	36,403,470	39,070,470	....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



blown in included 2 independent steel company and 1 merchant stack.

No change has been made in the number of possibly active furnaces, which is still 362.

Capacity Active on Oct. 1

On Oct. 1 there were 179 furnaces blowing compared with 187 on Sept. 1. The estimated rate of the 179 furnaces was 90,800 tons per day; on Sept. 1 the 187 furnaces had an estimated operating rate of 93,800 tons per day.

Manganese Alloy Production

Ferromanganese made in September amounted to 20,675 tons, or the smallest this year. It compares with 21,279 tons in August, up to that time the smallest for this year. Spiegeleisen at 6037 tons in September was the smallest this year; in August 9104 tons was made.

Furnaces In and Out

Among the furnaces blown in during September was one furnace at the Lackawanna plant of the Bethlehem Steel Corporation in the Buffalo district; one furnace of the Alan Wood Iron & Steel Co. in the Schuylkill Valley and one Shenango furnace in the Shenango Valley.

Among the furnaces blown out or banked during September was the Mary furnace of the Thomas Iron Co. and one spiegeleisen furnace of the New Jersey Zinc Co. in the Lehigh Valley; one Clairton furnace of the Carnegie Steel Co. and one Aliquippa furnace of the Jones & Laughlin Steel Corporation in the Pittsburgh district; one Newcastle furnace of the Carnegie Steel Co. in the Shenango Valley; the Norton furnace in Kentucky; the Top Mill furnace of the Wheeling Steel Corporation in the Wheeling district; one Ohio

furnace of the Carnegie Steel Co. in the Mahoning Valley; one Detroit furnace of the M. A. Hanna Co. in Michigan; one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama, and the Johnson City furnace in Tennessee.

Low Bidders on Hudson River Bridge

The McClintic-Marshall Co., Pittsburgh, and the John A. Roebling Sons Co., Trenton, N. J., were the low bidders on the steel work for the bridge which is to span the Hudson River from New York to Fort Lee, N. J. The bids which were opened Oct. 3 by the Port of New York Authority showed the McClintic-Marshall bid to be \$10,134,440 on the towers and floors, while the Roebling company offered \$12,339,977 for the cables, making a low total for the two of \$22,474,417. The bidding was of interest, not only because of the size of the bridge, but also on account of the alternative designs which were proposed for the structure. As described in THE IRON AGE, Aug. 25, 1927, page 466, decision is to be made between a wire cable design and heat-treated eye-bar construction. The following bids which were submitted on the two designs are illustrative of the comparative costs:

Entire contract:	Eye-Bars	Wire Cable
McClintic-Marshall Co.	\$25,962,020	\$23,026,620
American Bridge Co.	24,485,370	24,670,800
Towers and floors:		
American Bridge Co.	10,821,620	10,305,220
McClintic-Marshall Co.	10,640,040	10,134,440
Bethlehem Steel Co.	11,143,670	10,621,020
Cables:		
American Bridge Co.	13,985,605	14,969,455
John A. Roebling Sons Co.		12,339,977
American Cable Co.		12,403,168

Iron and Steel Markets

Little Change in Steel Situation

Continued Summer Scale of Demand is Reacting on
Prices—36 Fewer Blast Furnaces Active
Than a Year Ago

PIG iron statistics throw some light on the present state of activity in iron and steel. On Oct. 1 there were 179 blast furnaces in operation making iron at a rate of 90,800 tons a day. A year ago 215 furnaces were active producing 105,480 tons daily.

Steel making operations have not expanded from the rate reached in the last week of September, and there are as yet no well defined indications of improvement in the general business situation. Steel production of the nine months of this year is considerably ahead of that for the same period of 1925, the best year, save 1926, that the industry has ever known. The fourth quarter then was active, but if the expected expansion this last quarter approximates 15 per cent over the third, 1927 will be on a parity with 1925.

The September output of pig iron was 2,774,949 tons, or 92,498 tons a day, comparing with 2,947,276 tons, or 95,073 tons a day in August. The loss per day was 2575 tons, or 2.7 per cent. In all, eleven furnaces were blown out, four of the Steel Corporation, three of independent steel companies and four of the merchant producers; three stacks were blown in, two of them of independent steel companies and one a merchant stack. The total production for the nine months of the year is 28,104,000 tons, or 1,300,000 tons less than in the same period of 1926 and 1,000,000 tons more than in 1925.

Demand that is only slightly above the summer level is having an effect on prices. The week has seen a decline of \$2 a ton in automobile body sheets. Blue annealed sheets have weakened \$2, or to 2.15c., Pittsburgh, chiefly in the narrow widths in meeting competition with strip sheets. Like deviations in black and galvanized sheets, however, are only occasional, although 2.75c., Ohio mill, has been done on the latter.

The effort to establish a premium of \$2 a ton in bars, plates and shapes on small lots has not been thoroughly successful. Somewhat lower prices rule on large diameter pipe, including oil industry products, as a result of a revision of the supplementary discounts, although the move is regarded as one for stabilization.

Wire nails are facing a test, because buyers, still getting deliveries on third quarter purchases, have not had to specify against the \$2.55 per keg price.

The establishing of quantity differentials on hot rolled strips has been followed by several sales to Michigan automobile companies.

Rail orders for 80,000 tons are reported from Chicago, and the Pennsylvania has allocated 200,000 tons, plus 100,000 tons on option. Among fresh inquiries is that of the Missouri-Kansas-Texas road

for 12,500 tons of 90-lb. sections for the second half of 1928.

Lettings of 24,000 tons of fabricated structural steel were noteworthy as not covering any contract of outstanding size. Among new projects is a bridge at Cleveland, which will require 18,000 tons, and a pipe line near San Francisco, taking 6000 tons. Altogether some 42,000 tons was added to pending structural business.

Pig iron demand is unusually light in all centers, and in the Birmingham district there is less forward buying than at any time since 1921. In most markets prices are untested because of a dearth of inquiries, but in southern Ohio and in central Indiana a new low price of \$16.50, base furnace, is reported on Lake foundry iron. Aggressive competition by Lake Erie furnaces has also been felt by Chicago producers, who have been forced to cut prices \$1.50 to \$2 a ton to hold trade in northern Indiana and western Michigan. In the Valleys, an effort to make a speculative purchase of 10,000 tons of basic at \$1 a ton below the market was unsuccessful.

Heavy melting scrap has declined 50c. a ton at Pittsburgh and 25c. a ton at Chicago, St. Louis and Detroit. With demand from steel companies diminishing and with railroad scrap offerings increasing, the only sustaining market influence is the reluctance of yard dealers and industrial producers of scrap to sell their accumulations at prevailing low prices.

With the settlement of the coal strike in Illinois, non-union mines in West Virginia and elsewhere no longer expect extra demands on them from the Middle West. Reductions in the production of bee-hive coke in the Connellsville district have failed to stiffen prices. There is almost no call for furnace coke and the demand for other grades is limited.

British competition in pig iron is reported in our Berlin radiogram as increasing, and the German pig iron syndicate has reduced prices 75c. and \$1.50 a ton on steel making and other irons. Competition there is also developing concessions in medium and thin sheets.

A Belgian-French rail syndicate has secured a 51,000-ton rail order from Manchuria.

Exports of machinery from the United States in August, at \$41,018,828, represent the largest month's shipments since 1921. July, also, was an unusually large month, but lacked 2 per cent of the August total. The trend has been consistently upward since 1921.

Both of THE IRON AGE composite prices are unchanged this week, finished steel remaining at 2.346c. a lb. and pig iron at \$18.09 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
No. 2, fdy., Philadelphia...	\$20.26	\$20.26	\$20.26	\$21.76
No. 2, Valley furnace....	17.50	17.50	17.50	18.50
No. 2, Southern, Cin'tl....	20.94	20.94	20.94	23.69
No. 2, Birmingham.....	17.25	17.25	17.25	20.00
No. 2 foundry, Chicago*....	19.50	19.50	19.50	21.00
Basic, del'd eastern Pa....	20.00	20.00	20.00	20.75
Basic, Valley furnace....	17.00	17.00	17.25	18.00
Valley Bessemer, del. P'gh.	19.76	19.76	19.76	20.76
Malleable, Chicago*.....	19.50	19.50	19.50	21.00
Malleable, Valley.....	17.50	17.50	17.50	18.50
Gray forge, Pittsburgh....	18.76	18.76	18.76	19.76
L. S. charcoal, Chicago....	27.04	27.04	27.04	27.04
Ferromanganese, furnace..	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
O.-h. rails, heavy, at mill..	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh....	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh....	34.00	34.00	34.00	36.00
Forging billets, P'gh....	39.00	39.00	39.00	40.00
O.-h. billets, Phila.....	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	43.00	43.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.75	1.75	1.80	1.90

Finished Iron and Steel,	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.07	2.07	2.12	2.22
Iron bars, Chicago.....	1.90	1.90	2.00	2.00
Steel bars, Pittsburgh....	1.75	1.75	1.80	2.00
Steel bars, Chicago.....	1.85	1.90	1.90	2.10
Steel bars, New York....	2.09	2.09	2.14	2.34
Tank plates, Pittsburgh....	1.75	1.75	1.80	1.90
Tank plates, Chicago.....	1.85	1.90	1.90	2.10
Tank plates, New York....	2.09	2.09	2.09	2.24
Beams, Pittsburgh.....	1.75	1.75	1.80	2.00
Beams, Chicago.....	1.85	1.90	1.90	2.10
Beams, New York.....	2.09	2.09	1.95	2.34
Steel hoops, Pittsburgh....	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.00
Sheets, black, No. 24, Chi-				
cago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh.	3.85	3.85	3.85	3.85
Sheets, galv., No. 24, Chi-				
cago dist. mill.....	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh.	2.15	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chi-				
cago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.65
Wire nails, Chicago dist.				
mill.....	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist.				
mill.....	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh.	3.25	3.25	3.25	3.35
Barbed wire, galv., Chicago				
dist. mill.....	3.30	3.30	3.30	3.40
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
Heavy melting steel, P'gh.	\$15.00	\$15.50	\$15.50	\$17.00
Heavy melting steel, Phila.	14.00	14.00	14.00	16.50
Heavy melting steel, Ch'go	12.00	12.25	12.25	13.00
Carwheels, Chicago.....	13.75	13.75	14.50	14.50
Carwheels, Philadelphia...	15.50	15.50	15.50	17.50
No. 1 cast, Pittsburgh....	14.75	15.00	15.00	16.00
No. 1 cast, Philadelphia...	16.50	16.50	16.00	17.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.75	16.50
No. 1 RR. wrot. Phila....	15.50	15.50	15.50	17.00
No. 1 RR. wrot. Ch'go (net)	10.50	11.00	11.50	13.00

Coke, Connellsville, Per Net Ton at Oven:	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
Furnace coke, prompt....	\$2.85	\$2.85	\$2.85	\$3.50
Foundry coke, prompt....	4.00	4.00	4.00	4.50

Metals,	Oct. 4, 1927	Sept. 27, 1927	Sept. 6, 1927	Oct. 5, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.25	13.25	13.25	14.37 1/2
Electrolytic copper, refinery	12.00	12.90	13.00	14.00
Zinc, St. Louis.....	6.00	6.20	6.27 1/2	7.35
Zinc, New York.....	6.35	6.55	6.62 1/2	7.70
Lead, St. Louis.....	6.00	6.00	6.05	8.35
Lead, New York.....	6.25	6.25	6.40	8.65
Tin (Strait), New York...	59.50	58.75	63.75	71.50
Antimony (Asiatic), N. Y.	11.00	10.50	11.75	13.62 1/2

Pittsburgh

Ingot Output at 55 Per Cent—Steel Prices Unsettled

PITTSBURGH, Oct. 4.—The opening of the final quarter of the year gives no evidence of the improvement that long has been expected in the steel business. Indeed, if steel works and rolling mill operations are a criterion, business is poorer, because there is no class of rolling mill that is more fully engaged than recently, while ingot production is now definitely under 60 per cent of capacity in this and nearby districts and two steel works blast furnaces have ceased production in the past week or 10 days. Of the 107 steel works blast furnaces only 54 are now active. Ingot production is particularly low in the Youngstown district, where it is averaging only about 50 per cent, and the rate in the Pittsburgh, Johnstown and Wheeling districts is not sufficiently high to produce a general average of much more than 55 per cent. Structural mills are running better than any of the other finishing mills, but even they are not fully engaged, while 60 per cent of capacity is regarded as a fair estimate of the average rate of other classes of rolling mills.

Continued dullness is not without effect upon prices, and as is usually the case when buyers become skeptical regarding the stability of the market, they are reducing their purchases. The week has seen a decline of \$2 a ton in prices of automobile body sheets; that of itself would not be a serious development if it were not for the fact that it threatens to weaken the sheet market generally. There is some uncertainty in strip steel prices, and the effort to establish plates, shapes and

bars in small lots at a premium of \$2 a ton over the price on large tonnages or to large tonnage buyers has not yet been successful. Actually, 1.75c. is quoted on lots as small as a carload. Somewhat lower prices rule on steel pipe as a result of a revision of the supplementary discounts, but this is really a stabilization effort, since for some time there has been irregularity both in mill and secondary prices. The prices of nails and other wire products governed by the price of nails are not yet very well defined, because buyers are working on late third quarter tonnages and have yet to reach the point of giving the market a test.

Some increase in interest in steel supplies is noted on the part of motor car builders and a number of fourth quarter contracts have been written, but the significance of this development is minimized by the fact that the contracts are for requirements and give the steel makers no definite clue to what may be wanted and when. Railroad steel orders are in much the same category, since lately the practice has been to take bids quarterly and then to order by the month. Business for early rolling and shipment is still the principal need of steel manufacturers, and that need is emphasized by the lack of the usual amount of trade in tin plate and pipe.

The tone of general business is low in this district, since the settlement of the coal strike in Illinois deprives the local and West Virginia mines of business that was expected in the event of continued suspension in the Illinois fields and the glass industry, an important one in this part of the country, is largely suspended through a dispute over wages.

There is no activity worthy of note in primary materials, and while pig iron prices are holding, weakness is very evident in scrap and fuel. The scrap dealer now has the problem of finding a buyer at any price,

and the only sustaining influence in the market is the fact that not many scrap producers are willing to sell at current levels.

Pig Iron.—The largest individual transaction noted in the past week was a sale of 250 tons of Bessemer iron. There is so little activity in pig iron that sometimes the question comes up as to whether there is a market. Foundry iron is selling entirely in carload lots. There is very little open market activity in basic iron, but it is reported that a middle interest acting for a steel company recently made a bid of \$16 for 10,000 tons; the best offer that was made was \$17. Prices are holding not because of the demand or because supplies are not available, but because of a common belief that the market is as low as it should be; in other words, that the market is completely liquidated. W. P. Snyder & Co. makes the average price of Bessemer iron shipped from Valley furnaces in September \$18 and of basic, \$17.08, as compared with \$18.31 and \$17.25 respectively in August.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free	27.50

Freight rate to the Pittsburgh or Cleveland districts, \$1.76.

Ferroalloys.—Contract buyers of ferromanganese, high grade ferrosilicon and spiegeleisen are specifying very sparingly, in some instances taking less than half their monthly quotas. Except that \$33, furnace, is now as much as is asked for single carloads of 20 per cent spiegeleisen, the dullness is without effect upon prices, since producers generally recognize that the light demand is the result of reduced requirements and that price cuts would not bring out additional specifications or purchases.

Semi-Finished Steel.—This market reflects fully the light demand for sheets, tin plate and strips. Producers generally say that there have been few quieter periods in billets, slabs and sheet bars than they have been experiencing in the past few months. Prices are unchanged, but they are nominal since they are getting no real test in the shape of sizable inquiries. With scrap and basic pig iron at the lowest levels in recent years, to say nothing of the current weakness in finished steel prices, non-integrated steel manufacturers, if they were interested in the market at all, would want supplies for less than present prices. Rod buyers are "living" off third quarter contract tonnages specified before the end of that period, and \$43, base Pittsburgh or Cleveland, is yet to be paid on any considerable quantity. Activity in forging quality steel and in skelp is limited.

Wire Products.—The market is not yet very well defined on nails and the other wire products that move in price with nails. While a good many fourth quarter contracts have been written which carry a price of \$2.55, base per keg, Pittsburgh, for nails, most jobbers had until Sept. 30 to specify against third quarter ton-

nages carrying \$2.50 and the necessity for specifying against fourth quarter commitments has not yet arisen. In a general way business is still slow, but makers are hopeful of a fairly good fall business from the agricultural districts on account of the high prices of cotton and grain and the possibility that the harvest of corn will be greater than it recently promised to be.

Rails and Track Supplies.—Local makers will share in orders for tie plates and spikes to be distributed by the Pennsylvania Railroad over the next 90 days, but there is little enthusiasm in the reports about rail accessory business, because that road and a number of others now take bids quarterly and then order on a monthly basis. So far as can be learned, the Pennsylvania inquiry did not bring out any lower prices than recently have been quoted. On track bolts, steam railroads are made an exception to the general list and discount plan of quotation and still are being sold on a pound basis. Outside of the Pennsylvania Railroad standard-section rails, bookings by the local maker have been light so far. Light-section rails are dull.

Tubular Goods.—Although a new card of pipe discounts has not been issued, steel pipe prices generally are lower as a result of a revision of the supplementary discounts applying to both welded and seamless pipe. For some time there has been some irregularity in mill prices, which was reflected in the secondary market. In a general way, the revision means a cut of approximately 5 per cent. No change has been made in wrought iron pipe, but it is commonly expected that a change in line with that in steel pipe will be made. There is still a moderately active demand for butt welded pipe, but lap welded and seamless goods are dull. Some good-sized tonnages of gas line pipe are in sight, although not moving very rapidly toward mill order books.

Sheets.—Automobile body sheets have weakened and while a few makers are still quoting 4.25c., base Pittsburgh, all companies are meeting a cut of \$2 a ton made by an Ohio mill about a week ago. This weakness has not extended to other finishes, but a decline in black sheets is expected, if for no other reason than to maintain the usual price relationship between black and automobile body sheets. Mills here and in Youngstown still call the market 3c., base Pittsburgh, on black sheets and continue to ascribe lower prices to the tin mill sizes, on which the width limit is 36 in. Blue annealed sheets wider than 36 in. are still selling at 2.25c., base, and local makers have taken a few good-sized tonnages at that figure. Deviations on galvanized sheets are very infrequent. The general picture of the market, however, is rather unpromising, as there is not enough business to maintain mill operations of more than 65 per cent and the ease with which body sheets were forced down makes makers doubtful about the maintenance of prices on other finishes.

Tin Plate.—The market is very slow so far as new business is concerned, and while mill operations are averaging 60 per cent or a little higher, the principal dependence of manufacturers for rolling schedules is on advance 1928 orders. These are not so plentiful as advance orders were a year ago, as container manufacturers are more conservative about anticipating their needs, since productive capacity has gained in the past

THE IRON AGE Composite Prices

Finished Steel

Oct. 4, 1927, 2.346c. a Lb.

One week ago	2.346c.
One month ago	2.367c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low
1927	2.453c., Jan. 4;	2.339c.,	Apr. 26
1926	2.453c., Jan. 5;	2.403c.,	May 18
1925	2.560c., Jan. 6;	2.396c.,	Aug. 18
1924	2.789c., Jan. 15;	2.460c.,	Oct. 14
1923	2.824c., Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Oct. 4, 1927, \$18.09 a Gross Ton

One week ago	\$18.09
One month ago	18.04
One year ago	19.63
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1927	\$19.71, Jan. 4;	\$18.00,	Sept. 13
1926	21.54, Jan. 5;	19.46,	July 13
1925	22.50, Jan. 13;	18.96,	July 7
1924	22.88, Feb. 26;	19.21,	Nov. 3
1923	30.86, Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel		Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.	
F.o.b. Chicago	1.85c. to 1.95c.	
Del'd Philadelphia	2.07c. to 2.17c.	
Del'd New York	2.09c. to 2.19c.	
Del'd Cleveland	1.94c. to 2.04c.	
F.o.b. Cleveland	1.75c. to 1.85c.	
F.o.b. Birmingham	1.95c. to 2.05c.	
C.i.f. Pacific ports	2.35c. to 2.45c.	
F.o.b. San Francisco mills.....	2.35c. to 2.45c.	
Billet Steel Reinforcing		
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.	
F.o.b. Birmingham	1.95c. to 2.05c.	
Rail Steel		
F.o.b. mill	1.65c. to 1.75c.	
F.o.b. Chicago	1.85c. to 1.95c.	

Iron		
Common iron, f.o.b. Chicago.....	1.90c. to 2.00c.	
Refined iron, f.o.b. P'gh mills.....	2.75c. to 2.85c.	
Common iron, del'd Philadelphia.....	2.07c. to 2.12c.	
Common iron, del'd New York.....	2.09c. to 2.14c.	

Tank Plates

Base Per Lb.	
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago	1.85c. to 1.95c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.94c. to 2.04c.
Del'd Philadelphia	2.07c. to 2.12c.
Del'd New York	2.09c. to 2.14c.
C.i.f. Pacific ports	2.30c. to 2.40c.

Structural Shapes

Base Per Lb.	
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago	1.85c. to 1.95c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.94c. to 2.04c.
Del'd Philadelphia	2.07c. to 2.17c.
Del'd New York	2.09c. to 2.19c.
C.i.f. Pacific ports	2.35c. to 2.45c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.	
All gages, narrower than 6 in., P'gh.....	2.30c. to 2.40c.
All gages, 6 in. to 12 in., P'gh.....	*2.10c. to 2.20c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh.....	2.30c. to 2.40c.
net	2.30c. to 2.40c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh.....	2.40c. to 2.50c.
net	2.40c. to 2.50c.
All gages, narrower than 6 in., Chicago.....	2.40c. to 2.50c.
All gages, 6 in. and wider, Chicago.....	2.20c. to 2.30c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports	\$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports	\$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

Base Per Lb.	
Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.55c.
Strips, under 12 in., 1 up to 3 tons, P'gh.....	3.25c. to 3.35c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.25c. to 3.35c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.55c. to 3.65c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.40c. to 3.50c.
Stripsheets, 12 in. and wider, Pittsburgh mill	3.00c. to 3.10c.
Stripsheets, 12 in. and wider, Cleveland mill	3.00c. to 3.10c.
Stripsheets, 12 in. and wider, del'd Chicago.....	3.30c. to 3.40c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg	
Wire nails	\$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

Base Per 100 Lb.	
Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9.....	3.00
Barbed wire, galv'd.....	3.25
Barbed wire, painted.....	3.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton	
F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed		Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.15c. to 2.25c.	
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.35c. to 2.45c.	
Nos. 9 and 10, del'd Philadelphia.....	2.47c. to 2.57c.	
Nos. 9 and 10, f.o.b. Birmingham.....	2.40c. to 2.50c.	

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 24, f.o.b. Ch'go dist. mill.....	3.10c. to 3.20c.
No. 24, del'd Philadelphia.....	3.22c. to 3.32c.
No. 24, f.o.b. Birmingham.....	3.15c. to 3.25c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.15c. to 4.25c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.95c. to 4.05c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.85c. to 3.95c.
No. 24, f.o.b. Chicago dist. mill.....	3.95c. to 4.05c.
No. 24, del'd Philadelphia.....	4.07c. to 4.17c.
No. 24, f.o.b. Birmingham.....	4.00c. to 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill.....	3.20c. to 3.30c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.15c. to 4.25c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.20c. to 4.30c.
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Tin Plate

Per Base Box	
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind. 5.60	

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.40	25-lb. coating I.C. \$17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series		Base Per 100 Lb.
Numbers		
21.00* (½% Nickel, 0.10% to 0.20% Carbon)		\$2.90 to \$3.00
2300 (¾% Nickel)		4.10 to 4.20
2500 (5% Nickel)		5.00 to 5.25
3100 (Nickel Chromium)		3.10 to 3.20
3200 (Nickel Chromium)		4.75 to 5.00
3300 (Nickel Chromium)		6.75 to 7.00
3400 (Nickel Chromium)		6.00 to 6.25
5100 (Chromium Steel)		3.10 to 3.20
5200* (Chromium Steel)		7.00 to 7.50
6100 (Chrom. Vanadium bars)		4.10 to 4.30
6100 (Chrom. Vanad. spring steel)		3.60 to 3.80
9250 (Silicon Manganese spring steel)		3.00 to 3.15

Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.10 to 4.30
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.10 to 3.20
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

Per Gross Ton	
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill	\$36.00 to \$38.00

Track Equipment

Base per 100 Lb.	
Spikes, ¾ in. and larger.....	\$2.80 to \$2.90
Spikes, ½ in. and smaller.....	2.80 to 3.00
Spikes, boat and barge.....	3.10
Tie plates, steel.....	2.35
Angle bars	2.75
Track bolts, to steam railroads.....	3.90 to 4.00
Track bolts, to jobbers, all sizes, per 100 count, 70 per cent off list	

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld			
Inches	Steel	Inches	Iron
1/4	45	1/4 to 3/4	+11 +39
1/2	51	1/2	22 2
3/4	56	3/4	28 11
1	60	1 to 1 1/2	30 12
1 to 3	62		
		Lap Weld	
2	55	2	23 7
2 1/2 to 6	59	2 1/2	25 11
7 and 8	56	3 to 6	25 13
9 and 10	45	7 to 12	26 11
11 and 12	53		

Butt Weld, extra strong, plain ends

1/4	41	1/4 to 3/4	+19 +54
1/2	47	1/2	21 17
3/4	53	3/4	28 12
1	58	1 to 1 1/2	30 14
1 to 1 1/2	60		
2 to 3	61		
		Lap Weld, extra strong, plain ends	
2	53	2	23 9
2 1/2 to 4	57	2 1/2	25 15
4 1/2 to 6	56	4 1/2 to 6	28 14
7 to 8	52	7 to 8	21 15
9 and 10	45	9 to 12	16 2
11 and 12	44		

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2 1/4 in.....	27	1 1/2 in.....	+19
2 1/2 to 3 in.....	37	1 1/2 to 1 3/4 in.....	+3
3 in.....	40	2 to 2 1/4 in.....	—2
3 1/4 to 3 3/4 in.....	42 1/2	2 1/2 to 3 in.....	—7
4 to 13 in.....	46	3 1/4 to 4 1/2 in.....	—9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.....	60
1 1/4 to 1 1/2 in.....	52
1 1/2 in.....	36
2 to 2 1/4 in.....	31
2 1/4 to 2 1/2 in.....	39
3 in.....	51
3 1/4 in.....	53
4 in.....	56
4 1/2, 5 and 6 in.....	51

Hot Rolled

2 and 2 1/4 in.....	37
2 1/2 and 2 3/4 in.....	45
3 in.....	51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List	
Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

year and promises to be further enlarged by the first of the year through the extension of the Gary, Ind., works of the American Sheet & Tin Plate Co. and the introduction of continuous mills for breaking down the tin bars. Nothing has been said yet about 1928 prices, but no one is looking for an advance.

Cold-Finished Steel Bars and Shafting.—Orders from automobile parts makers are a little more numerous, but there has not been a corresponding gain in tonnage and the market is best described as quiet. Prices appear to be steadier than they have been, and on Detroit business it has not been necessary for makers to go under 2.10c., base Pittsburgh or Chicago.

Bolts, Nuts and Rivets.—The market on bolts and nuts lacks activity, but not firmness. With a demand that is not sufficient to provide an engagement of more than 50 per cent of productive capacity, makers are taking a stronger stand on prices and are making the 70 per cent discount effective only on lots of a carload or more, while for the smaller tonnages they are quoting from 55 to 60 per cent off list. There is considerable bookkeeping and packing expense in handling the smaller lots, and to avoid it, the manufacturers are quoting practically the same prices as are named by jobbers. Fourth quarter contracting in bolts, nuts and rivets has been active, but there is not much specifying, since buyers and distributors have ample supplies on hand or coming along on third quarter contracts to meet their present requirements.

Bars, Plates and Shapes.—While occasional carloads of these products sell at 1.80c., base Pittsburgh, it is unusual for makers to make sales as high as 1.85c. and the prevailing price is 1.75c., even on lots as small as a carload. There is no clear definition of what constitutes the large and the small lot buyer, and consequently the line cannot be very closely drawn. Structural mills are still busy, but fabricating shops note a loss in unfilled orders through a decline in new inquiry. With no appreciable improvement in the call for cold-finished steel bars or in bolts, nuts and rivets, specifications for hot-rolled bars are still light. Plate business is very light.

Hot-Rolled Flats.—Business is very quiet, notwithstanding the booking of a number of fourth quarter contracts from automobile builders. These contracts are for requirements and no definite tonnages are named, and when the tonnage will be wanted is almost as indefinite. Prices show some irregularity, but in a general way, and particularly on the smaller tonnages, makers are holding to recent prices.

Cold-Rolled Strips.—Makers are doing slightly better in point of shipments, which in the past week averaged approximately 67 per cent of capacity as compared with 62 per cent in the previous week, while new bookings were approximately 53 per cent compared with a little more than 50 per cent the week before. No change was made in the base price of cold-rolled strip in the recent revision of quantity differentials. The base price is still 3.25c., Pittsburgh or Cleveland, for lots of 1 ton up to 3 tons, with a reduction of 25c.

per 100 lb. for lots of 3 tons or more and with the old extras for lots of less than 2000 lb.

Coke and Coal.—Shrinking output of beehive oven coke is proving ineffective in bringing about a firmer price situation, because there is almost no demand for metallurgical use and only a limited demand for other uses. The coal market still suffers from an oversupply and it does not promise to be any stronger, since the prospect of some good-sized orders from the Central West because of the suspension of the union mines in Illinois has passed with the recent settlement of the strike in that State. There are two views of that adjustment; some seem to fear that it means a settlement in Indiana and in Ohio and at least a temporary victory for the coal miners' union, but the more common view is that it defeats a rise in prices, without which the union cannot successfully fight for a maintenance of the Jacksonville scale of wages. In the Pittsburgh district there is no indication of a resumption of former relations between operators and the union.

Old Material.—This market is weaker and on most grades about 50c. a ton lower than a week ago. Three steel companies in this district have stopped shipments on their orders, and that means that dealers who had the orders have stopped buying against them. With no fresh buying from other directions, it is a problem for the shipper to find a purchaser. It is certain that heavy melting steel cannot be sold at more than \$15, but there is no basis for a lower quotation on that grade, since scrap producers are unlikely to sell for less while they have any storage space. It will be interesting to see what the railroads get for their scrap this month. There is so little market activity that prices merely are appraisals of what might be done.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:

Heavy melting steel.....	\$15.00
Scrap rails	\$14.00 to 14.50
Compressed sheet steel.....	14.50
Bundled sheets, sides and ends...	13.50
Cast iron carwheels.....	15.00
Sheet bar crops, ordinary.....	15.00 to 15.50
Heavy breakable cast.....	13.75 to 14.25
No. 2 railroad wrought.....	15.00
Heavy steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	11.50 to 12.00

Acid Open-Hearth Furnace Grades:

Railroad knuckles and couplers..	16.25 to 16.50
Railroad coil and leaf springs...	16.25 to 16.50
Rolled steel wheels.....	16.25 to 16.50
Low phosphorus billet and bloom ends	19.50 to 20.00
Low phosphorus, mill plate.....	19.00 to 19.50
Low phosphorus, light grade.....	17.00 to 17.50
Low phosphorus sheet bar crops...	18.50 to 19.00
Heavy steel axle turnings.....	13.50 to 14.00

Electric Furnace Grades:

Low phosphorus punchings.....	17.00 to 17.50
Heavy steel axle turnings.....	13.50 to 14.00

Blast Furnace Grades:

Short shoveling steel turnings...	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings.....	11.00 to 11.50
No. 2 busheling.....	10.00 to 10.50

Rolling Mill Grades:

Steel car axles.....	19.00 to 20.00
No. 1 railroad wrought.....	12.00 to 12.50

Cupola Grades:

No. 1 cast.....	14.75 to 15.75
Rails 3 ft. and under.....	15.50 to 16.00

Malleable Grades:

Railroad	15.00
Industrial	14.50
Agricultural	14.00

Warehouse Prices, f.o.b. Pittsburgh

Base per 1 lb.

Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, 3/4 in. and smaller, per 100 count, 62 1/2 per cent off list	
Machine bolts, per 100 count, 62 1/2 per cent off list	
Carriage bolts, per 100 count, 62 1/2 per cent off list	
Nuts, all styles, per 100 count, 62 1/2 per cent off list	
Large rivets, base per 100 lb.....	\$3.50
Wire, black soft annealed, base per 100 lb....	2.90
Wire, galvanized soft, base per 100 lb.....	2.90
Common wire nails, per keg.....	\$2.80 to 2.90
Cement coated nails, per keg.....	2.85 to 2.95

The Columbia Tool Steel Co., Chicago Heights, Ill., has brought out a high-speed steel which gives an increase in cutting capacity over that of the company's Clarite. The new formula reduces the tungsten content of Clarite to about 18 per cent and nearly doubles its vanadium content. The heat treatment, which is practically the same as that for Clarite, is 2350 to 2450 deg. Fahr., oil quench, followed by 1050 to 1100 deg. Fahr. draw.

The Kelly-Decker-Cleary Co., Produce Exchange Building, New York, has been appointed exclusive sales agent in metropolitan New York and northern New Jersey for the Domestic Coke Corporation, Fairmont, W. Va., maker of Fairmont by-product coke.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1 1/4-in.	\$33.50 to 34.00
Forging, ordinary	38.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.75c. to 1.85c.
Sheared	1.75c. to 1.85c.
Universal	1.75c. to 1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40% ..	3.00 per ton over base
Carbon 0.41% to 0.55% ..	5.00 per ton over base
Carbon 0.56% to 0.75% ..	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$43 to \$44. Cleveland mill base, \$42 to \$43.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.50c.
Iron ore, Swedish, average 66% iron, 9.75c. to 10.00c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	39c. to 40c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.50 to \$10.75
Chromite ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.85 to \$3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.46 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis....	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.65 to 1.85
Mine run gas coal, f.o.b. Pa. mines	1.85 to 2.00
Steam slack, f.o.b. W. Pa. mines..	1.10 to 1.15
Gas slack, f.o.b. W. Pa. mines....	1.25 to 1.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$32.00 to \$33.00
Domestic, 16 to 19%.....	31.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$85.00 to \$87.50
75%	145.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%	\$45 to 46.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$34.00
10%	36.00
11%	36.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	\$26.50
6%	27.50
7%	28.50
8%	30.00
9%	30.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	\$11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Aniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$16.00 to \$16.50
No. 2 lump, Illinois and Kentucky mines..	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
	First Quality Second Quality
Pennsylvania	\$43.00 to \$46.00 \$35.00 to \$38.00
Maryland	43.00 to 46.00 35.00 to 38.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00 35.00 to 38.00
Kentucky	43.00 to 46.00 35.00 to 38.00
Missouri	43.00 to 46.00 35.00 to 38.00
Illinois	43.00 to 46.00 35.00 to 38.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square....	70
Hot-pressed nuts, blank or tapped, hexagon....	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh. †Bolts with rolled threads up to and including 1/2 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages.....	80, 10 and 5
Stove bolts in bulk.....	80, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discount of 70 per cent off on bolts and nuts applies on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

	Base per 100 Lb.
(1/2-In. and Larger)	
F.o.b. Pittsburgh or Cleveland.....	\$2.75
F.o.b. Chicago	2.85 to 3.10

Small Rivets

	Per Cent Off List
(1/8-In. and Smaller)	
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10 and 16
Milled standard set screws, case hardened.....	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread, 8 and 5	
Upset hex. cap screws, S.A.E. thread.....	80, 10 and 16
Upset set screws.....	80, 10 and 16
Milled studs	70 and 5

Chicago

Demand Unaffected by Steel Price Cut —80,000 Tons of Rails Bought

CHICAGO, Oct. 4.—While mill prices have generally settled to a basis of 1.85c., Chicago, on plates, shapes and bars, there is no evidence that buyers can be induced to deviate from the practice of ordering only for immediate requirements. Ingot production in this district remains at 60 per cent of capacity, and there is a fair balance this week in sales, specifications and shipments. The degree of firmness that may be expected in the new prices, which are now \$2 a ton above the minimum quotations at Pittsburgh, will depend somewhat on Eastern competition and price levels in other producing centers. Another factor, however, will be whether the mills can check the practice of offering plate and shape fabricators protection at quotations below the general market on projects that are in the making. Probably 30 days will have to pass before tonnages protected at 1.80c. are delivered.

Lower production of automobiles is reflected in the demand for cold-rolled strip, bars and hot-rolled strip. Other manufacturing lines show little change in rate of output but are holding stocks to the minimum. Justification for this is found in prompt and satisfactory deliveries made by mills and the fact that there is no well defined indication of improvement in the general business situation.

Pig Iron.—More active competition for going business by producers, who find that sales no longer balance production, is resulting in weakness in Chicago district pig iron prices. Local makers are maintaining prices at \$19.50, base furnace, for delivery in Chicago and Milwaukee, but \$19 is rapidly becoming the ruling quotation in outlying territory to the south and west. Prices on iron from producing centers east of here are making it necessary for Chicago producers to quote \$1.50 to \$2 below the local market to hold trade in northeastern Indiana and western Michigan. Forward contracting is light, it being evident that melters who were willing to make commitments are for the most part covered, while other buyers are willing to operate with low stocks and depend on prompt service from producers. The unsteadiness of prices is undoubtedly holding back some heavy tonnage purchases. Gray iron jobbing and manufacturing foundries are taking the bulk of shipments, while malleable foundries are operating close to the low point of the year. Several spot sales of charcoal iron have been made at \$24, furnace.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil.	19.50
High phosphorus	19.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent. copper free	\$30.50 to 31.00
Silvery, sil. 8 per cent.	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Spiegeleisen prices are weak in a dull market. Quotations on carload lots are at \$33, Hazard, Pa., for the 19 to 21 per cent grade, but offers of \$32 have been made on prospective orders for 150 tons to 200 tons. The ferromanganese market is quiet, and specifications for ferrosilicon continue to shrink.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$39.76 to \$40.76.

Plates.—New sales in plates and prospects for added business in the near future are tending to give new life to a commodity that has been listless for several months. An oil refiner in the Southwest has placed an order for 4000 tons to be used in the con-

struction of oil storage tanks, and a fresh inquiry from a similar source is for 1500 tons. The trade is now figuring on about 6000 tons of oil tank material. The railroad equipment market, enlivened last week by a tentative inquiry for 500 to 1000 box cars, has been given further encouragement by an inquiry from the Chicago, St. Paul, Minneapolis & Omaha for 250 hopper car bodies and the announcement that the Northern Pacific contemplates heavy repairs to 500 or more box cars. The Great Northern is continuing its car building program, which includes the underframing of 2500 freight cars and the construction of 500 to 1000 box cars and 150 flat cars a year. Total freight car purchases in the first nine months of this year were about on a par with the corresponding period of 1926, while in passenger cars 1927 shows heavier buying by a small margin. Prices paid for plates in the week definitely establish the Chicago market at 1.85c. The stability of this price will require further test, since 1.85c., Chicago, has not been unknown in recent weeks and also because of the fact that the newly established price is now being quoted on a wide range of tonnages.

Mill prices on plates per lb.: 1.85c., base, Chicago.

Bars.—In accordance with tendencies of the past week or ten days, the price of soft steel bars in this district has fallen to 1.85c., Chicago. Producers are naming this price with the intent that it shall be the minimum, thereby narrowing the heretofore widening circle of preferred buyers. Mild steel bars still remain the most active of the heavy tonnage products. New buying and specifications are about equal to shipments. Requirements of the farm implement trade are holding up, but there is little disposition among consumers to build up stocks and most specifications are for delivery at the earliest convenience of producers. Road machinery manufacturers are operating at a steady rate and appear to be riding through what in the past has been the dull season with little, if any, curtailment in output. Demand from the automobile trade is lighter, nearly 15 per cent smaller than in August. The iron bar market is dull, and prices are nominal at 1.90c., Chicago. Specifications for alloy steel bars are growing lighter as manufacturers of automobiles and makers of accessories place closer limits on their production. Prices on rail steel bars are weak, being influenced by the lowered quotations on soft steel bars. New orders this week are the best in several months, and specifications exceed production by a sufficiently wide margin so that producers are giving serious thought to lengthening the hours of double turn operations, which still obtain at both Chicago Heights mills. Releases for quick shipment by bed manufacturers indicate an upturn in production and an expansion in sales in that industry.

Mill prices per lb.: Soft steel bars, 1.85c. base, Chicago; common bar iron, 1.90c., base, Chicago; rail steel bars, 1.85c., base, Chicago.

Sheets.—Prices are steady except on blue annealed sheets in narrow widths, which are meeting with strong competition from stripsheet producers. Hot mill operations are at close to 70 per cent of capacity, and order books are being replenished from week to week. Jobbers are more active in the market than any other single class of buyers. Shipments to them, however, are below what is usually expected at this time of the year, and individual orders are small and for immediate delivery.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Rails and Track Supplies.—Western mills have added 80,000 tons of standard-section rails to their books. Of this amount, 30,000 tons was placed by a Western railroad and 40,000 tons represents about 80 per cent of the amount purchased this week by an Eastern railroad with a terminal at Chicago. The Pennsylvania order for 300,000 tons is expected to be placed in the next day or two. Delivery schedules prepared on orders taken to date will have little bearing on mill output before about the first week in December. Orders for track accessories total 9000 tons, and inquiry now before the trade bulks large. Light rails are quiet, but the settlement this week of the coal miners'

strike in Illinois is expected to result in orders for this commodity. Several small inquiries for iron tie plates are now before the trade.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. Per Lb.: Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Cast Iron Pipe.—The National Cast Iron Pipe Co. is low bidder at Chicago on 500 tons of 12-in. pipe at \$25.80, Birmingham, or \$34, delivered Chicago. Other bidders named prices that ranged upward to \$29, Birmingham. The American Cast Iron Pipe Co. is low bidder on 100 tons of fittings for Chicago and is reported to have been awarded 675 tons of 6-in. and 315 tons of 8-in. Class B pipe by Akron, Ohio. St. Claire Shores, Mich., will open bids Oct. 11 on 1500 tons of 6-in. and 1800 tons of 8-in. Class B pipe. Keen competition for certain sizes of pipe is accountable at least in part for low prices. Some foundries are able to make delivery in almost any size in 10 days, while others are booked for 30 to 40 days. Books are not balanced, however, and each producer is anxious for added tonnage in certain diameters.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$34.20 to \$37.20; 4-in., \$38.20 to \$41.20; Class A and gas pipe, \$4 extra.

Structural Material.—Sales of shapes ranging up to 2000 tons each have been made in the week at 1.85c., Chicago. Although some quotations are still being made at 1.90c., most transactions are at the lower level. Structural awards are for the most part individually small, the exception this week being 2000 tons for a hotel apartment building in Chicago. Prices for plain material have not advanced above the low point reached several weeks ago, and shops are still anxious to increase bookings as an assurance against a sharp curtailment of output in the late fall months. Fresh inquiry is more promising, but those projects that have been before the trade, many of them for a number of months, are still dormant. An open-hearth building for the Wisconsin Steel Works will take 2400 tons, and an apartment building in Chicago calls for 1100 tons. The construction of the *Chicago Daily News* building, which has been delayed because of a controversy over air rights, appears to be finally getting under way, inasmuch as a small lot of steel has been purchased for the construction of experimental press-room floors and a small tonnage of foundation steel is being asked for.

Mill prices on plain material per lb.: 1.85c., base Chicago.

Reinforcing Bars.—A contract placed this week for 600 tons of billet steel reinforcing bars brought a price of 2.30c., Chicago warehouse. For several weeks small tonnages have commanded 2.55c., or higher. This commodity is quotable in a range from 2.30c. to 2.75c. The rail steel product is commonly sold at 2c. to 2.10c. Activity in this market a week ago has been followed by a lull in buying. Several sizable projects may be placed at an early date, but the bulk of the tonnage will call for rail steel bars. Fresh inquiry is only a trifle below seasonal expectations, but it is noticeable that individual projects are small. Recent awards and fresh inquiries are shown on page 992.

Bolts, Nuts and Rivets.—Specifications for these

commodities against contracts for the third quarter were in smaller total volume than in the second quarter. Shipping orders in late September showed some improvement, and as the new month begins the rate of the past two weeks is being maintained.

Wire Products.—This, the second week of moderately active sales, is being taken by some as a true indication that the fall buying movement is under way, but it is rather generally admitted that the volume of business so far booked is a disappointment. The market as a whole is lacking in assurance, as though it might expand, but would as readily contract. The best that can be said of trade from manufacturing users is that it is relatively steady. Orders from jobbers, while well spread out over the country, clearly indicate a degree of uncertainty. Mill stocks are well assorted, but they are not heavy. Production of wire and wire products averages a shade below 55 per cent of mill capacity. Mill prices for plain wire are steady, but quotations on nails lack strength.

Coke.—Chicago by-product coke is steady at \$9.75, local ovens, and \$10.25, delivered in the Chicago switching district. Shipments are moving forward steadily and oven capacity is fully engaged.

Old Material.—Scrap is marked by lower prices and dullness. Simultaneously with a diminishing demand, railroad lists are growing heavier. There is a strong disposition on the part of the carriers to bring in scrap at a more rapid rate to avoid handling it under winter weather conditions. The Chicago & North Western is offering 1500 tons of rerolling rails, and the St. Paul sold 2500 tons of the same grade last week. Brokers are buying cast iron borings at lower prices, not because the available supply is growing, but because the demand is less active. Heavy melting steel is off 25c. to a maximum of \$12.50 a gross ton. A steel mill has taken 6000 tons at \$12.25. A Pennsylvania list totals 50,000 tons and the Chicago & North Western will sell 10,700 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.00 to \$12.50
Shoveling steel.....	12.00 to 12.50
Frogs, switches and guards, cut apart, and miscellaneous rails.....	13.25 to 13.75
Hydraulic compressed sheets.....	10.50 to 11.00
Drop forge flashings.....	9.00 to 9.50
Forged, cast and rolled steel car wheels.....	15.00 to 15.50
Railroad tires, charging box size.....	15.00 to 15.50
Railroad leaf springs, cut apart.....	15.00 to 15.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles.....	13.50 to 14.00
Coil springs.....	15.00 to 15.50
Low phosphorus punchings.....	13.75 to 14.25
Electric Furnace Grades:	
Axle turnings.....	12.00 to 12.50
Blast Furnace Grades:	
Axle turnings.....	11.00 to 11.50
Cast iron borings.....	10.50 to 11.00
Short shoveling turnings.....	10.50 to 11.00
Machine shop turnings.....	7.25 to 7.75
Rolling Mill Grades:	
Iron rails.....	13.00 to 13.50
Rerolling rails.....	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.....	15.50 to 16.00
Angle bars, steel.....	13.75 to 14.25
Cast iron carwheels.....	13.75 to 14.25
Malleable Grades:	
Railroad.....	13.50 to 14.00
Agricultural.....	12.75 to 13.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.....	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars.....	13.50 to 14.00
Iron arch bars and transoms.....	18.50 to 19.00
Iron car axles.....	20.00 to 20.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	10.50 to 11.00
No. 2 railroad wrought.....	10.25 to 10.75
No. 1 bushelling.....	9.00 to 9.50
No. 2 bushelling.....	5.00 to 5.50
Locomotive tires, smooth.....	13.25 to 13.75
Pipes and flues.....	7.50 to 8.00
Cupola Grades:	
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	13.50 to 14.00
No. 1 agricultural cast.....	12.00 to 13.50
Stove plate.....	12.50 to 13.00
Grate bars.....	11.00 to 11.50
Brake shoes.....	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.30c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands.....	3.65c.
Hoops.....	4.15c.
Black sheets (No. 24).....	3.95c.
Galvanized sheets (No. 24).....	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.
	Per Cent Off List
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank.....	60
Hot-pressed nuts, hexagons, tapped or blank.....	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

New York

Prices on Steel Still Uncertain—Large Reinforcing Bar Lettings

NEW YORK, Oct. 4.—Demand for pig iron is confined mainly to small tonnages for mixture purposes, and sales of local brokers during the week totaled less than 4000 tons. Inquiries have not been sufficiently large or attractive to subject prices to a real test. Eastern Pennsylvania foundry iron is still quoted at \$19 to \$19.50, base furnace, for delivery in this district, and small lots of Buffalo foundry have been sold at \$17, base furnace. Eastern New York furnaces, although frequently quoting \$18, base furnace, are still pursuing a flexible price policy, dictated by the necessity for meeting the delivered quotations of producers in other centers. While foundry melt in this district has not declined to any great extent recently, it is not gaining, and melters are therefore cautious about adding to their pig iron commitments. Foundries serving the railroad equipment industry are operating at a very low rate and are buying iron in unusually small lots. The American Car & Foundry Co., New York, has bought against its inquiry for 200 tons of foundry for Berwick, Pa., and is now in the market for 200 tons of gray forge for the same plant. Perhaps the largest transaction of the week was the purchase of about 600 tons of foundry iron by a New Jersey melter.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail).....	\$21.41 to \$21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn).....	19.00 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	20.14 to 22.02
East. Pa. No. 2 fdy., sil. 2.25 to 2.75.....	20.64 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	21.14 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Finished Material.—September business in this district was generally far ahead of either July or August in point of tonnage, but low operating schedules and the uncertainty of prices continue to give the market a pessimistic tone. While 1.75c., Pittsburgh, is being generally adhered to as a minimum on plate business it is becoming increasingly difficult to secure higher prices on very small tonnages, and the \$2 differential announced a short time ago by the Carnegie Steel Co. seems to mean not over \$1 in this territory. New business is light. The bar price seems to have settled to 1.75c., Pittsburgh, for even rather small orders, and buyers express a belief that 1.70c. would be possible on large tonnages and contract business. Absence of substantial tonnages in the last few weeks has made it difficult to test the price of shapes. Strip competition has continued to cut down the business of producers of blue annealed sheets, and the market in this grade of sheets may be fairly quoted at 2.15c., Pittsburgh, a decline of \$2 a ton from the recent price. Black and galvanized sheets, however, have not suffered correspondingly, and few concessions from 3c. and 3.85c., respectively, are reported on the general run of business. Some jobbers have been able to buy at \$2 under these figures, but this is not unusual in the market and can hardly be said to be representative. Shading of 2.10c. to 2.30c., Pittsburgh or Cleveland, is still mentioned in the case of hot-rolled strip, but larger producers have hesitated to cut the price in the face of poor demand. On cold-rolled strips, price weakness is shown in the breaking down of tonnage differentials, and it is not difficult to buy rather small lots at 3c., Pittsburgh. Demand for pipe is being maintained at the usual seasonal rate but the possibility of a heavy demand from the oil country before the first of the year is regarded unlikely.

Mill prices per lb. delivered New York: Soft steel bars, 2.09c. to 2.19c.; plates, 2.09c. to 2.14c.; structural shapes, 2.09c. to 2.19c.; bar iron, 2.09c. to 2.14c.

Reinforcing Bars.—The McClintic-Marshall Co. will furnish 1350 tons of bars for a building for the American Can Co. in Jersey City, and the Concrete Steel Co. will provide 1000 tons for a sewage disposal plant at Allentown, Pa. Several other fair-sized jobs have

been let in the last few days, and the considerable number of large inquiries which have come out in the past fortnight have given the market the first real activity since early summer. Some distributors in this territory have reduced the Youngstown and New York warehouse prices \$2 per ton, and bars are now quoted at 2.30c., out of Youngstown warehouse, or 2.67½c., delivered New York, and at 2.95c., delivered at job out of New York warehouse.

Ferroalloys.—An inquiry for 300 tons of ferromanganese for delivery in the last quarter is noted. There have been sales of a few carloads and small lots. Inquiries for spiegeleisen total about 600 tons, with one consumer attempting to buy 400 tons at considerably less than the regular quotation of \$33, furnace. Specifications on contract for both alloys are reported to be better than in recent weeks and the same is true of ferrosilicon and ferrochromium.

Warehouse Prices, f.o.b. New York

Base per Lb.

Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons.....	4.00c.
Flats and squares.....	4.50c.
Cold-rolled strip, soft and quarter hard,	
5.75c. to 6.25c.	
Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage).....	3.89c.
Long terne sheets (No. 24 gage).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	5.15c.
Wire, galvanized annealed.....	3.30c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ½ in. and	
larger.....	3.65c.
Open-hearth spring steel, bases.....	4.50c. to 7.00c.
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	55 to 60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	55 to 60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.....	55 to 60
1 x 16 in. and smaller.....	50 to 50 and 10
Boiler Tubes— Per 100 Ft.	
Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¾-in. butt.....	46	29
¾-in. butt.....	51	37
¾-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
¾-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	3.95c. to 4.00c.
No. 22.....	4.10c. to 4.15c.
No. 24.....	4.15c. to 4.20c.
No. 26.....	4.25c. to 4.30c.
No. 28*.....	4.40c. to 4.45c.
No. 30.....	4.65c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.35c.
No. 16.....	4.45c.
No. 18.....	4.55c. to 4.60c.
No. 20.....	4.70c. to 4.75c.
No. 22.....	4.75c. to 4.80c.
No. 24.....	4.90c. to 4.95c.
No. 26.....	5.15c. to 5.20c.
No. 28*.....	5.40c. to 5.45c.
No. 30.....	5.80c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Cast Iron Pipe.—Purchasing of gas and water pipe continues to be limited to small lots in most instances. While prices as yet show no advance, some of the undertone of weakness that has recently been a feature of the market has disappeared and makers are endeavoring to establish a minimum of \$30 per net ton, base Birmingham. Actual transactions, however, indicate a going market of \$28 to \$29, Birmingham. The leading pipe interest is said to be operating at a lower rate than at any time in a number of years. Recent purchases by the American Construction & Securities Co., New York, for its various properties total about 3500 tons, made up of lots ranging from 75 tons to as much as 750 tons. The Hackensack Water Works, Hackensack, N. J., has closed on about 2200 tons of water pipe with the Warren Foundry & Pipe Co. The Passaic Consolidated Water Co., Passaic, N. J., has closed on about 3000 tons of concrete water pipe with the Lockjoint Pipe Co., Ampere, N. J.

Prices per net ton delivered New York: Water pipe 6-in. and larger, \$37.25 to \$38.25; 4-in. and 5-in., \$42.25 to \$43.25; 3-in., \$52.25 to \$53.25; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—There is a fair demand for small lots of structural material from stock and purchasing of black and galvanized sheets is in good volume, although prices continue to be shaded on desirable orders. Concessions are also reported on bolts and screws, making the current market rather irregular. Blue annealed sheets are inactive, but the market is firm with apparently no concessions of consequence being made.

Coke.—The market continues quiet, and there have been some slight reductions in prices on special grades of coke. Standard foundry is being quoted at \$4 to \$4.25, Connellsville, and the furnace grade is somewhat weaker at \$3 to \$3.25. The majority of consumers were covered some time ago for fall requirements, and there is little interest in spot purchases. Delivered prices on Connellsville foundry coke are: To northern New Jersey, \$8.03 to \$8.28; to New York or Brooklyn, \$8.79 to \$9.04; to Newark or Jersey City, N. J., \$7.91 to \$8.16. By-product coke continues to range from \$9.46 per net ton for West Virginia coke to \$9.59 and \$10.77 per net ton for local production, delivered Newark or Jersey City.

Old Material.—Prices of most grades are substantially unchanged, but there is an undertone of weakness and in some instances brokers are filling their contracts at slightly lower buying prices than a week or two ago. No. 1 heavy melting steel shipments are confined to Claymont, Del., and Bethlehem, Pa., at \$13.50 per ton, delivered, and yard grade is going to consumers at Phoenixville and Harrisburg, Pa., at \$11 and slightly less, with brokers offering \$10.50 to \$10.75 per ton, delivered to a Pottsville, Pa., consumer. Machine shop turnings are quoted at \$10.50 to \$11 per ton, delivered. While \$13 per ton is being paid by most brokers for specification pipe delivered to a Lebanon, Pa., mill, in a few instances only \$9 is offered. Heavy breakable cast is quoted at \$15.50 per ton, delivered to Claymont, Del., or Coatesville, Pa. Shipments of heavy melting steel to Conshohocken, Pa., and of borings and turnings to Swedeland, Pa., are still suspended. Chemical borings and stove plate are inactive.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	7.00 to 7.50
No. 1 heavy breakable cast.....	11.50 to 12.50
Stove plate (steel works).....	9.00
Locomotive grate bars.....	8.75 to 9.25
Machine shop turnings.....	7.00 to 7.25
Short shoveling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	7.25 to 7.50
Mixed borings and turnings.....	6.50 to 7.50
Steel car axles.....	16.25 to 17.25
Iron car axles (nom.).....	23.50 to 24.00
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	9.00 to 9.25
Forge fire.....	6.50 to 6.75
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	10.25 to 10.75
Cast iron carwheels.....	11.50 to 12.00
Stove plate (foundry).....	9.00 to 9.50
Malleable cast (railroad).....	10.25 to 10.75
Cast borings (chemical).....	11.00 to 12.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.00

Cleveland

Automobile Body Sheets Decline \$2 a Ton —Large Bridge Under Inquiry

CLEVELAND, Oct. 4.—The demand for finished steel is still light, but some improvement is looked for this month. Orders are limited to small lots, and consumers are adhering to their policy of keeping their stocks low and ordering material as needed. Some activity developed in the automotive industry in the past week in Detroit, where sheet mills yielded to the pressure of buyers and reduced automobile body sheets \$2 a ton. The market on other grades of sheets shows a weak tone. The allowing of the quantity differentials on hot-rolled strip was followed by the placing of several lots of this material by Michigan automobile manufacturers. Several of the manufacturers of medium and high-priced motor cars are under good production, but this cannot be said of makers of low-priced cars. There is evidently very little change in the production schedule of automobile plants as compared with a month ago.

There is some irregularity in steel bar prices in this territory because of the competitive situation created by a local mill price of 1.75c., Cleveland, but on plates and structural material 1.75c., base Pittsburgh, is being firmly maintained. It is only in exceptional cases that mills are asking or getting above 1.75c. for small lots. Some of the mills report a slight improvement in the demand for plates, but orders are small. In the structural field the outstanding inquiry of the week is for 18,000 tons for a railroad bridge over the Cuyahoga River for the Cleveland Union Terminals Co. This company during the week placed 2500 tons in structural material and reinforcing bars for bridge work in connection with the union depot project. Considerable building work is coming out requiring small tonnages, and fabricators report that they are getting slightly better prices than prevailed recently.

Iron Ore.—Water shipments of Lake Superior ore during September amounted to 7,230,881 tons, a decrease of 2,390,875 tons, or 24.85 per cent, as compared with September last year. Shipments for the month also fell off sharply as compared with August, when the movement was 8,775,990 tons. The total movement for the year until Oct. 1 was 42,387,376 tons, a decrease of 2,843,532 tons, or 6.29 per cent, as compared with the same period last year. Shipments will slow down considerably more this month, as some of the ore firms do not have a great deal more ore to move this season. Recent estimates have been that the season's movement by water and rail will be from 53,000,000 to 55,000,000 tons as compared with 59,979,160 tons last year.

Pig Iron.—The market in this territory is extremely dull, but Cleveland producing interests obtained a moderate amount of business in outlying districts during the week, which brought their sales up to 14,000 tons, or about at the same total as in the two previous weeks. Buying is nearly all in small lots for fill-in purposes. Prices show no change, but there is not enough business to test the market on iron for shipment to highly competitive points. Foundry and malleable are generally quoted at \$17.50, furnace, by Lake producers, but some sellers appear willing to go lower for shipment to points where they have a freight disadvantage, and silicon differentials are not always being maintained.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.65c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

In Michigan \$18, furnace, is the asking price. For Cleveland delivery the market is unchanged at \$18.50, furnace. Considerable iron has been carried over from the third quarter, but furnaces with one or two exceptions shipped as much iron as they made last month, this being due to the fact that they were considerably oversold. Much of the iron that was held up in September was for the automotive industry. A slight improvement in the demand from this source is reported, especially from foundries making castings for the medium and high-priced motor cars. Makers of low-priced automobiles are still on very low production schedules.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$19.00
Southern fdy., sil. 1.75 to 2.25.....	23.25
Malleable	19.00
Ohio silvery, 8 per cent.....	31.50
Basic, Valley furnace.....	17.00
Standard low phos., Valley furnace.....	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Bolts, Nuts and Rivets.—The demand for bolts and nuts from the automotive industry continues light, and orders are not plentiful from other sources. Most rivet buyers have placed fourth quarter contracts, but orders are still scarce. No deviation from ruling quotations is reported on either bolts and nuts or rivets.

Semi-Finished Steel.—Specifications are light, and few new orders are being placed. Prices appear rather steady at ruling quotations.

Sheets.—A price reduction of \$2 a ton to 4.15c. per lb., base Pittsburgh, has been made on automobile body sheets, and prices on other grades are more irregular than they have been for some time. The lower price on automobile body sheets came out in Detroit, where several lots that did not run up to a very large tonnage were placed during the week. On black sheets 2.90c., Pittsburgh, appears to have become about as common as 3c. Blue annealed sheets are weak, with a price range of 2.15c. to 2.25c., Pittsburgh. The lower price is being quoted on all widths but is more common on narrow material, with which hot-rolled strip competes. There has been scarcely enough business recently to test prices on galvanized sheets, but the ruling quotation of 3.85c., Pittsburgh, is not always being adhered to and the sale of a 100-ton lot is reported at 3.75c., base Ohio mill. Aside from a slight improvement in orders from the automobile industry, the demand shows little, if any, increase. The Ford Motor Co. has shipped a 600-ton lot of sheet bars by water to the Otis Steel Co. in exchange for sheets.

Strip Steel.—Several orders for hot-rolled strip were placed by Detroit automobile plants during the week at concessions of \$2 or more from ruling prices, but this business evidently came from consumers who were allowed lower prices under the quantity differentials recently adopted by several mills. Locally the demand is very light, and prices are being maintained for the usual run of orders. There is not much activity in cold-rolled strip, on which prices appear to be holding.

Reinforcing Bars.—An award of 1200 tons for the Cleveland Union Terminals project was made during the week. Little inquiry is coming out. Rail steel bars are commonly quoted at 1.65c., mill, but this may be shaded \$1 a ton for a good-sized lot.

Warehouse Business.—The demand continues light. September sales by one jobber fell below those of August. Another reports an increase of the number of orders but a decrease in their average size, so that the tonnage shows no gain. Prices are being well maintained.

Old Material.—No consumer demand appeared during the week and there is little buying by dealers, as they have little tonnage on their books in unfilled orders. With the absence of a demand, the market has a weak tone and prices on many grades are largely nominal. Dealers purchased small lots of blast furnace scrap during the week at \$10.75, or the bottom of the quoted range in prices, and are now offering only \$10.50,

although they state that so far they have made no purchases at the reduced prices.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$13.75 to \$14.00
No. 2 heavy melting steel.....	13.25 to 13.50
Compressed sheet steel.....	13.25 to 13.50
Light bundled sheet stampings.....	11.50 to 12.00
Drop forge flashings.....	12.50 to 13.00
Machine shop turnings.....	9.00 to 9.25
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	13.75 to 14.00
No. 1 busheling.....	11.50 to 11.75
Pipes and flues.....	10.00 to 10.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops.....	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops.....	17.00 to 17.50
Low phosphorus sheet bar crops.....	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings.....	10.50 to 10.75
Mixed borings and short turnings.....	10.50 to 10.75
No. 2 busheling.....	10.50 to 10.75
Cupola Grades	
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling.....	16.25 to 16.50

Philadelphia

Pennsylvania Rails Distributed — Some Concessions in Sheet Prices

PHILADELPHIA, Oct. 4.—With the exception of the opening of bids by the Pennsylvania Railroad, Sept. 30, on plates, shapes, bars, rails and sheets and today on track bolts, spikes and tie plates, business in the steel market has been confined to the usual small purchases. Bids submitted on the Pennsylvania list showed but little variation from 1.75c. per lb. base on plates, shapes and bars, and throughout were f.o.b. mill. Concessions of 10c. per 100 lb. from the current market appeared in the low bids on the black, galvanized and blue annealed sheets.

Of the 300,000 tons of 130-lb. rails on the list, it is understood that 200,000 tons will be divided among the three leading makers as follows: About 100,000 tons to the United States Steel Corporation, 87,000 tons to the Bethlehem Steel Corporation and 13,000 tons to the Inland Steel Co.

There has been some purchasing of low phosphorus pig iron, and in a few instances regular customers have contracted for foundry iron requirements for the first quarter of next year at the present market level; otherwise the pig iron market is quiet.

Sheet mills are apparently satisfied that the production of strip steel sheets has thus far not had such far-reaching effects as had been expected. Some competition from the new product is being encountered, however, and sheet mills are apparently meeting the

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier.....	2.60c. to 2.80c.
Plates, 3/8-in.	2.80c. to 3.00c.
Structural shapes	2.50c. to 2.80c.
Soft steel bars, small shapes and iron bars (except bands).....	2.50c. to 2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1 1/2 x 1 1/2 in.....	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to 3/8-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24).....	4.35c.
Galvanized sheets (No. 24).....	5.20c.
Blue annealed sheets (No. 10).....	3.30c.
Diamond pattern floor plates—	
1/4-in.	5.30c.
3/8-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

prices of the strip mills when necessary to retain customers.

Pig Iron.—Sales of foundry grade are limited to carload lots and orders for a few hundred tons. Some contracts for small lots of foundry to be delivered in the first quarter of next year are reported, with the seller evidently willing to accept the business at the present quotation of \$20 per ton, base. No sales of basic are reported, but there have been a number of transactions in small lots of copper bearing low phosphorus at \$24 per ton, and at less on the larger tonnages. One of the more desirable purchases was 3000 tons for the Standard Steel Works, Burnham, Pa., understood to have gone to a large eastern Pennsylvania producer. The market on foundry grade continues at \$19.50 to \$20 per ton, base, f.o.b. furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.26 to \$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X.	21.26 to 21.76
Basic (delivered eastern Pa.)	20.00
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.29 to 25.54
Virginia, No. 2X, 2.25 to 2.75 sil.	25.79 to 26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—Sales are confined to small tonnages for prompt shipment, with the market unchanged at \$33 to \$34 per ton, f.o.b. Pittsburgh, for rerolling billets and \$38 to \$39 per ton, Pittsburgh, for forging quality.

Bars.—There is a moderate demand for small lots and prices are being fairly well maintained on the basis of 1.75c. per lb., Pittsburgh. This quotation is quite representative of the current small lot purchasing. On the 7500 tons in the list of the Pennsylvania Railroad, bids were 1.75c. per lb., Pittsburgh, Youngstown, Ohio, Johnstown, Pa., Struthers, Ohio, Buffalo and Cleveland; 1.80c. per lb., Midland, Pa., and 1.90c. per lb., Chicago. The leading interest, quoting 1.75c. per lb., f.o.b. mill, reserved the right to ship from any mill desired. Bar iron ranges from 1.75c. to 1.80c. per lb., Pittsburgh.

Shapes.—New business is limited, so that 1.75c. per lb., Pittsburgh, the current quotation, has not yet been put to a severe test. That this could be bettered on a desirable specification is considered probable. The Pennsylvania Railroad opened bids today on some small lots of structural material for bridges at Lansdowne, Pa., and Junction City, Ohio. Bids on 1000 tons of shapes for the Pennsylvania Railroad were 1.75c. per lb., Pittsburgh, Pottsville, Pa., Johnstown; 1.85c. per lb., Phoenixville, Pa., and 1.90c. per lb., Chicago and Indiana Harbor, Ind.

Plates.—The market is being well maintained at 1.75c. per lb., Pittsburgh, and small tonnages have brought up to 1.80c. per lb., base. Current inquiry for plates is small. Bids to the Pennsylvania Railroad on its requirements of 17,000 tons of plates were 1.75c. per lb., Pittsburgh, Conshohocken, Pa., Johnstown, Pa., Sparrows Point, Md., Youngstown, Ohio, and Cleveland; 1.80c., Steubenville, Ohio, and 1.90c. per lb., Chicago and East St. Louis, Ill.

Sheets.—On approximately 1000 tons of black, galvanized and blue annealed sheets in the Pennsylvania Railroad list quotations were substantially in line with the market except for one bid of 2.90c. per lb. on black and 3.75c. per lb. on galvanized. It is reported that 3.75c. per lb. has been done in this district on comparatively small tonnages of galvanized sheets, and shading has occurred on blue annealed sheets to the extent of about 10c. per 100 lb. Sheet producers are encountering some competition from strip steel sheet mills, and 2.15c. to 2.25c. per lb., base Pittsburgh, on blue annealed is understood to have been quoted to retain customers. It is claimed, however, that this competition has not been so severe as had been expected.

Warehouse Business.—Concessions on bars, shapes and plates from stock are growing more common, and on large lots of bars and shapes as low as 2.50c. per lb. has been done and on plates as low as 2.60c. per lb.

Swedish iron bars in desirable lots have sold down to as low as 6.25c. per lb., base. Sheet prices are fairly firm.

Imports.—In the past week a total of 7740 tons of manganese ore has been received from Russia; 500 tons of pig iron, 873 tons of blooms and 230 tons of shapes, from France; and 511 tons of structural shapes, from Belgium. Imports into the port of Philadelphia also included 21 tons of hoops and 71 tons of steel bars from Belgium and 24 tons of skelp iron from the United Kingdom.

Track Material.—Current buying is light. On the Pennsylvania Railroad list bids were in line with the current market on the 46,000 pairs of angle bars, 2,000,000 lb. of spikes, 370,000 tie plates and 250,000 track bolts.

Old Material.—With mills seeking to buy at lower prices and dealers unwilling to commit themselves on contracts at prices that might not bring out sufficient scrap, little business is being done. Prices are unchanged. A Claymont, Del., consumer has contracted for about 3000 tons of No. 1 heavy melting steel at \$14 per ton, delivered.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$14.00
Scrap T rails	\$13.00 to 13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50 to 12.00
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00 to 13.50
No. 1 low phos., heavy, 0.04 per cent and under	18.50 to 19.50
Couplers and knuckles	16.75
Rolled steel wheels	16.00 to 16.50
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.50 to 11.00
Steel rails for rolling	16.00 to 16.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Postpones Granite City Pig Iron Freight Rate Case

Following a two-day session, Examiner Howell, Interstate Commerce Commission, indefinitely postponed the case in which the St. Louis Gas & Coke Co., Granite City, Ill., attacks pig iron freight rates throughout the Central Freight Association and other freight territories. Testimony disclosed that of the 450,000 tons of iron produced each year by the Granite City company not more than 200,000 tons is shipped into the St. Louis district. Those opposed to changes in the present rate pointed out that the increases being sought would result in freight rate advances of 17c. to 94c. per gross ton. The disputed territory involves rail shipments from Duluth, Minn., Mayville, Wis., Chicago and Milwaukee; rail and barge shipments from the South to all points in Indiana, Michigan, Wisconsin, Missouri, Illinois, Minnesota and Iowa, and Missouri River and Ohio River crossings.

Ohio Commission Suspends Increases in Pig Iron Rates

The Ohio Public Utilities Commission has suspended until Nov. 24 rate increases on pig iron proposed by several railroads to become effective Oct. 15. A hearing will be conducted on the proposed advances, and it is expected that the tangle that has existed for a long time in Ohio pig iron rates will be taken to the courts for settlement. The Ohio commission has also rejected proposed advances in pig iron rates from Leetonia, Warren and Cleveland to Canton, Ohio, and from Canton and Massillon to Newcomerstown, Ohio. The decision in respect to these latter advances is final.

San Francisco

Large Plate and Structural Awards— Pipe Line to Take 6000 Tons

SAN FRANCISCO, Oct. 1 (*By Air Mail*).—Of more than usual interest this week was the placing of 850 tons of plates for a penstock for the Southern California Edison Co., booked by the Western Pipe & Steel Co.; the award of 2800 tons for the Biltmore Hotel addition, Los Angeles, secured by the Llewellyn Iron Works, and an inquiry by the Spring Valley Water Co., San Francisco, for a 6000-ton pipe line. Activity in the cast iron pipe market has fallen off somewhat, and demand for sheets and tubular goods remains spotty. Prices, on the whole, are being fairly well maintained.

Pig Iron.—Little of importance developed in the pig iron market this week, foundry activity all along the Coast being at low ebb. Several large shipments of foreign iron are en route, scheduled to arrive in the early part of this month. Both sales and inquiries this week were confined to small lots for prompt shipment. Prices continue unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25	...	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	...	25.00
**German foundry, sil. 2.75 to 3.25	...	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—One of the largest awards of the year, 2800 tons for a hotel, was booked this week in Los Angeles. Other lettings included 375 tons for a Masonic Home at Decoto, Cal., and 100 tons for a gymnasium at Oakland, Cal. Contracts placed so far this year are considerably in excess of bookings for the same period last year. Fabricators are encouraged over the fact that more projects are now coming up for figures. While it is true that the majority of these inquiries call for less than 100 tons each, a number of larger projects are included. Outstanding among the new inquiries of the week is 675 tons for an amusement park on the ocean beach in San Francisco. Competition for existing business is keen, and some low prices on fabricated material have recently appeared. Prices on plain structural shapes remain firm at 2.40c., c.i.f. Coast ports.

Plates.—For the first time in nearly two months an award of over 100 tons of plates has been placed. This called for 850 tons for a penstock for the Big Creek plant of the Southern California Edison Co. Considerable interest is being displayed both by mill men and fabricators in the inquiry of the Spring Valley Water Co. for a 54-in. pipe line running from San Andreas, Cal., to Laguna Honda reservoir, near Redwood City, Cal., and involving from 4000 to 6000 tons of steel. Demand for oil storage tanks is at a standstill, and from present indications little tonnage can be expected from this quarter during the remainder of the year. No change is noted in prices, 2.40c., c.i.f. Coast ports, continuing firm.

Bars.—New inquiries for reinforcing bars have shown improvement. Included are 800 tons for a theater in San Francisco on Market Street and 257 tons for a paving project at Pismo, Cal. As usual, the majority of bookings consists of lots ranging from 30 to 60 and 70 tons. The only award of moment this week was taken by the Frederick Steel Co. and called for 100 tons for a music building for Mills College, Oakland, Cal. Hoops and bands are not active. The Standard Oil Co., San Francisco, has just placed one

of the largest orders of the year. This called for 200 tons of hoops and was placed with an unnamed Eastern interest.

Cast Iron Pipe.—Prices remain weak and some low quotations have appeared. Awards this week were not heavy and totaled less than 1000 tons. The Lana Construction Co. secured 375 tons of 4 to 8-in. Class B pipe for the improvement of Main Street, Santa Ana, Cal. The Hardie-Tynes Mfg. Co., Birmingham, booked 232 tons of 96-in. pipe for the Coolidge Dam, San Carlos, Ariz., and an unnamed Eastern interest took 206 tons of 3 to 8-in. Class C pipe for the Veterans' Hospital at Tucson, Ariz. Bids were opened this week on 450 tons of 18-in. special pipe for the Greater Vancouver Water District, Vancouver, B. C. Bids were also received on 191 tons of 8 and 16-in. Class B pipe for the improvement of Fifty-fourth Street, San Diego, Cal., and on 131 tons for the improvement of Park Avenue, Glendale, Cal. Next week bids will be opened on 750 tons of 4 to 12-in. Class A and B or centrifugal pipe for Gladstone, Ore.

Steel Pipe.—The only award of moment this week in the standard pipe market was secured by the Grinnell Co. and involved 100 tons of 6-in. line pipe for the Santa Maria Gas Co., Santa Maria, Cal. Distributors report a better movement of stock during the past 10 days and are beginning to take encouragement over the outlook for the rest of the year.

Warehouse Business.—Sales totals for September are expected to show a substantial increase over those for August. Some changes in out-of-stock prices in San Francisco have occurred and are recorded in the table.

Birmingham

Less Forward Buying of Pig Iron Than at Any Time Since 1921

BIRMINGHAM, Oct. 4.—A fair degree of activity developed in the pig iron market in the latter part of last week. Buying was better than expected. Sales were confined almost entirely to October, only a few calling for deliveries through the rest of the quarter. The market has been on a spot basis for months, and there is little likelihood of an early change. There has been less forward buying of late than at any previous time, with the exception of 1921. Quotations are firm at \$17.25, base Birmingham. Consumers are buying in close step with current requirements and are asking for iron only a week or so in advance of needs. Curtailed buying by pipe plants is the weakest spot in the market. Shipments, however, have taken up practically all of the current production of merchant producers. Two of the three merchant producers in the Birmingham district shipped their make in September. Furnace operations are the same as for some weeks past, 19 stacks being in operation. Ten of these are on foundry, seven on basic, one on ferromanganese, and one on recarburizing iron. Shipments of about 20,000 tons of manganese ore from the Far East are expected within the next week by the Tennessee Coal, Iron & Railroad Co. This company is operating one of its furnaces at Bessemer, Ala., on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	.....	\$17.25
No. 1 foundry, 2.25 to 2.75 sil.	.....	17.75
Basic	.....	17.25

Finished Material.—Only a slight improvement in demand is noted. Prices remain unchanged. Buying of fence is expected to grow with the marketing of crops. Some increase has been felt already in this line. The Tennessee Coal, Iron & Railroad Co. is operating seven out of nine open-hearth furnaces at the Ensley Works and four out of eight at the Fairfield Works. The Gulf States Steel Co. is operating four of its six open-hearth furnaces at Alabama City, Ala., and there is a possibility that a fifth will be placed in operation this week. Its blast furnace, which produced foundry iron for six weeks, is back on basic. Bar and structural business is quiet. No announcement has yet been made by the Gulf States Steel Co. relative to its improvement program. Preliminary work is under way.

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and structural shapes	.....	3.15c.
Soft steel bars	.....	3.15c.
Small angles, $\frac{3}{8}$ -in. and over	.....	3.15c.
Small angles, under $\frac{3}{8}$ -in.	.....	3.55c.
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	.....	3.75c.
Spring steel, $\frac{3}{4}$ -in. and thicker	.....	5.00c.
Black sheets (No. 24)	.....	4.80c.
Blue annealed sheets (No. 10)	.....	3.75c.
Galvanized sheets (No. 24)	.....	5.35c.
Structural rivets, $\frac{1}{2}$ -in. and larger	.....	5.65c.
Common wire nails, base per keg	.....	\$3.35
Cement coated nails, 100-lb. keg	.....	3.35

Cast Iron Pipe.—The market is quiet, with little prospect of an early change. Pipe shop operations are on reduced schedules, and not much new business is in prospect. The base price at Birmingham on pressure pipe is around \$30, but quotations vary and have been less, depending on the tonnage and the individual letting. Galveston, Tex., opened bids last week on 70,000 ft. of 6-in., 20,000 ft. of 8-in., 5000 ft. of 10-in. and 10,000 ft. of 12-in.

Coke.—Demand for domestic coke is on the up-grade because of the approach of winter. Foundry coke is moving fairly well, but the rate is just about the same as during the past several months. Production is being kept close to market requirements. Shipments are about equal to production and very little coke is being stocked. Contracts are being booked from day to day, mostly for the last quarter. A little has been sold into next year, but the amount is relatively small. Quotations continue at \$5.50 per net ton, Birmingham, on contracts and \$6 for spot material. The Alabama By-Products Corporation expects to place a new unit of 49 Koppers ovens of the Becker type in operation on Oct. 14. This new unit will increase its daily producing capacity from 1000 tons to about 2000 tons.

Old Material.—Business is somewhat better than a few weeks ago. Prices are still low but are now showing a tendency to move upward. Buying of No. 1 cast and stove plate is good, but demand for steel grades is still spasmodic.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel.....	\$10.50 to \$11.00
Scrap steel rails.....	11.00 to 12.00
Short shoveling turnings.....	8.50 to 9.00
Cast iron borings.....	8.50 to 9.00
Stove plate.....	13.00 to 14.00
Steel axles.....	16.00 to 17.00
Iron axles.....	18.00 to 20.00
No. 1 railroad wrought.....	10.00 to 11.00
Rails for rolling.....	12.00 to 13.00
No. 1 cast.....	15.00 to 16.00
Tramcar wheels.....	12.50 to 13.50
Cast iron carwheels.....	12.00 to 13.00
Cast iron borings, chemical.....	13.50 to 14.00

St. Louis

Missouri-Kansas-Texas Inquires for Rails—Another Break in Scrap Prices

ST. LOUIS, Oct. 4.—Shipments of pig iron during September exceeded shipments for August, but buying during the past month was disappointing. Foundry operations were curtailed considerably during the early part of September on account of the unusually warm weather. Since then the melt has shown an increase, but most of the large steel plants in the district are operating considerably short of full capacity. Melters are waiting for orders for castings before buying raw materials. Business during the last week was very light, sales of the Granite City maker amounting to only 1400 tons, all for prompt shipment.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b.	
Granite City, Ill.....	\$19.50 to \$20.00
Northern No. 2 fdy., delivered	
St. Louis.....	21.66
Southern No. 2 fdy., delivered...	21.67
Northern malleable, delivered....	21.66
Northern basic, delivered.....	21.66

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock.....	3.75c.
Black sheets (No. 24).....	4.80c.
Galvanized sheets (No. 24).....	5.35c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets.....	4.65c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets.....	3.60c.
Boiler rivets.....	3.80c.
	Per Cent Off List
Tank rivets, $\frac{7}{16}$ -in. and smaller.....	70
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot pressed nuts, square, blank or tapped...	60
Hot-pressed nuts, hexagon, blank or tapped.	60

Coke.—Buying of coke from by-product ovens in this district shows further improvement because of the apparent failure of peace negotiations in the southern Illinois coal fields. Shipments during September were ahead of those in the same period last year. Prices at local by-product ovens for October are \$9.75 for foundry grades, \$11.50 for domestic furnace and \$12 for egg size.

Rails.—The first rail inquiry in this district for 1928 requirements has come from the Missouri-Kansas-Texas Railroad, which will buy 12,500 tons of 90-lb. rails for delivery during the second half of 1928. A small road has purchased 550 tons of 90-lb. rails for immediate shipment.

Finished Iron and Steel.—Interest in reinforcing bars centers in the second unit of the Rive Des Peres sewer project, for which the Whitmire Construction Co., Kansas City, is low bidder. This unit will require 7700 tons of reinforcing bars, instead of 5000 tons, as previously reported. Damage done by a tornado which struck St. Louis last Thursday was principally to homes, but necessary repairs to other structures are expected to require a considerable tonnage of steel. Buying of galvanized sheets continues in satisfactory volume. Warehouse business was about 10 per cent less in September than during August. Structural fabricators report business dull.

Old Material.—The only transaction of consequence during the week was the purchase of 5000 tons of rails for rolling by a mill in this district. Mills are buying only such material as they need in the manufacture of finished products for which they have orders. Stocks in hands of consumers are small, and dealers are buying only to fill contracts, laying down very little in their yards. Heavy melting steel and heavy shoveling steel, No. 1 locomotive tires, bundled sheets and No. 2 railroad wrought are off 25c. a ton each, while miscellaneous rails, rails for rolling, steel angle bars and No. 1 machinery cast have declined 50c. a ton. Railroad lists include: Pennsylvania Lines, 40,000 tons; Chicago, Milwaukee & St. Paul, 8700 tons; Big Four Lines, 4000 tons; Missouri Pacific, 4300 tons; Terminal Railroad Association of St. Louis, 1300 tons; Mobile & Ohio and Belt Railway of Chicago, 900 tons each, and Atlanta & West Point Railroad, 12 miles of 80-lb. relaying rails.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel.....	\$11.50 to \$12.00
No. 1 locomotive tires.....	14.00 to 14.50
Heavy shoveling steel.....	11.50 to 12.00
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	13.75 to 14.25
Railroad springs.....	15.00 to 15.50
Bundled sheets.....	8.25 to 8.75
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 busheling.....	10.25 to 10.75
Cast iron borings.....	9.25 to 9.75
Iron rails.....	12.50 to 13.00
Rails for rolling.....	14.75 to 15.25
Machine shop turnings.....	6.75 to 7.25
Steel car axles.....	19.00 to 19.50
Iron car axles.....	23.50 to 24.00
Wrought iron bars and transoms.....	20.00 to 20.50
No. 1 railroad wrought.....	11.00 to 11.50
Steel rails, less than 3 ft.....	15.00 to 15.50
Steel angle bars.....	12.25 to 12.75
Cast iron carwheels.....	13.00 to 13.50
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable.....	12.50 to 13.00
No. 1 railroad cast.....	13.00 to 13.50
Agricultural malleable.....	12.00 to 12.50
Relaying rails, 60 lb. and under...	20.50 to 23.50
Relaying rails, 70 lb. and over...	26.50 to 29.00

Youngstown

Steel Output on 50 Per Cent Basis—Pig Iron Being Piled

YOUNGSTOWN, Oct. 4.—The opening of the final quarter of the year finds only about half of the steel-making capacity of the Mahoning and Shenango valleys engaged, and the demand for the finished products of the mills does not warrant a greater production of ingots. At least two companies in the area are not running as well as 50 per cent of capacity. Although only 14 of the 29 steel works blast furnaces in the two

valleys are in production, more iron is being made than is finding its way into consumption, and the retention of even that many stacks on the active list is due solely to the fact that there is no other outlet for the coke produced in the by-product ovens. If the blast furnaces are not kept on to use the coke, it is necessary to keep the ovens warm to prevent them from falling in. Producing coke and piling up pig iron is considered the least costly alternative.

The Youngstown district steel manufacturers probably are feeling the depression in steel business a little more keenly than those in other producing districts, for the reason that the products in which the district excels in output are the ones that just now are in the least demand. The district runs heavy to the production of pipe, sheets and bars. The fact that the oil industry in its effort to overcome overproduction is doing only a limited amount of drilling tells on pipe orders, while the automotive industry, the leading factor in sheet consumption and among the leading users of bars, for some time has been buying with great conservatism. No small part of the bars that go into consumption as cold-finished bars are shipped by local mills, and at least one sheet producer who does not make automobile body sheets does make a good many sheet bars that are rolled into body sheets.

The district also produces a goodly tonnage of strips, the principal outlet of which is to the automobile parts makers. Plates, wire products and tin plate also are on the list of Youngstown district products, but just now none of these lines is showing much activity. Greater diversification of production does not appear possible, nor does it seem feasible for the manufacturers to reduce output in some directions and increase it in others. The country already has too much productive capacity in plates, wire products and tin plate to stand expansion in this area, which, some manufacturers believe, has reached the limit of growth in keeping with its location. The district has but slight advantage in the matter of freight rates as compared with Pittsburgh district mills on finished steel products and does not have the advantage of lower delivery charges afforded Pittsburgh district mills through water-borne shipments to the South and Southwest. Moreover, most Pittsburgh district producers can bring in their coal supplies cheaply by river, while those in this district are obliged to stand the higher rail rates, and that advantage more than offsets the saving that Youngstown manufacturers have in lower ore rates from the lower Lake docks.

The fact that expectations of better business have failed to materialize in the past month has made manufacturers here rather cautious about predictions as to what is ahead. Generally, however, the feeling is that it is late in the year for decided improvement, and the date of a real upturn is being put over to the last month of the year, when preparations for the early part of 1928 will begin to be reflected.

Prices appear to be holding fairly well, but the decline to 4.15c., base Pittsburgh, for automobile sheets, is not a welcome development to makers here, who have regarded 4.25c., base, as being too low to permit a fair profit to be realized. Mills are getting 1.80c., base, occasionally for single carloads of bars, but for large tonnages or on even carloads from large buyers, 1.75c., base, is the usual price. Some irregularity is admitted in pipe prices. Strip makers are not having heavy demands, and the proposed quantity differentials on the hot-rolled product, with buyers of lots of 5000 tons or more annually entitled to deductions of \$2 to \$3 a ton, has produced much price uncertainty.

Activity is lacking in pig iron, and partly because they have large stocks of iron and a very low rate of steel works engagement, the steel makers are showing little interest in scrap. Sales of No. 1 busheling are noted at \$14.50, and assuming the usual differential of \$1 a ton, heavy melting steel is nominally quotable at \$15.50.

Heavy Melting Scrap Declines 25c. a Ton at Detroit

DETROIT, Oct. 4.—Further signs of weakness have developed during the past week in the scrap market in this district, with heavy melting and shoveling steel registering a decline of 25c. per ton and with other

grades more commonly quoted at the minimum prices in the range. Pig iron shipments for this month promise to be a little above the September volume. The gain is attributable to an increase in stove and furnace manufacturing rather than to any expansion in the operations of the automotive industry.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	\$12.25 to \$12.75
Borings and short turnings	9.00 to 9.50
Long turnings	7.50 to 8.00
No. 1 machinery cast	17.00 to 18.00
Automobile cast	18.50 to 19.50
Hydraulic compressed sheets	11.00 to 11.50
Stove plate	11.50 to 12.50
No. 1 busheling	10.00 to 10.50
Sheet clippings	7.50 to 8.00
Flashings	10.25 to 10.75

Toronto

Good Volume of Pig Iron Contracting for Fourth Quarter

TORONTO, ONT., Oct. 4.—The closing of third quarter and the opening of the last quarter brought in some improvement in pig iron sales. During the past week a number of lagging melters entered the market with last quarter contracts, and inquiries now before the trade indicate a steady demand on this account during the coming week. It is now estimated that upward of 50 per cent of the pig iron contract buyers have now covered for the remainder of the year. The greater part of last quarter contracts came into the hands of producers unsolicited. Owing to the prevailing low prices for foundry and malleable iron most Canadian producers have not been pushing for new business, but have been satisfied to accept only that which was offered voluntarily. Manufacturers of sanitary ware and radiators have been rather prominent in the market of late, while a few of the larger jobbing foundries have also placed advance contracts. Canadian agricultural implement makers are still buying the greater part of their pig iron from United States producers, with the result that imports now average more than 3000 tons per month, most of that total coming from the United States. American producers are now seeking business here, and competition has been much keener of late than during earlier months this year.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	\$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	25.50
No. 2 foundry, sil. 1.75 to 2.25	25.50
Malleable	25.50
Basic	24.50
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Inquiries and sales on last quarter account have been heavier in the Canadian markets during the past week. Melters are not entering the market with a rush, but on the contrary are taking their own time, making their requirements known when the spirit moves them. During the past week or two several of the larger consumers came forward with fairly big contracts for last quarter, while others have substantial contracts pending. Improvement is also noted in spot sales in both the Toronto and Montreal districts.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$9.00
Rails, scrap	10.00	10.00
No. 1 wrought	10.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	8.00
Cast borings	7.50	6.00
Steel turnings	7.00	7.00
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	17.00	17.00
Stove plate	12.50	12.50
Standard carwheels	16.00	16.00
Malleable scrap	14.00	14.00
	Per Net Ton	
	Toronto	Montreal
No. 1 machinery cast	15.00	.....
Stove plate	9.00	.....
Standard carwheels	13.00	.....
Malleable scrap	13.00	.....

Boston

Pig Iron Market Quiet, Scrap Weak— Reinforcing Bars in Good Demand

BOSTON, Oct. 4.—Business in pig iron in the past week was confined to sales of small lots of various brands, mostly for mixture purposes, including Mystic, eastern New York State, western Pennsylvania, Alabama and Buffalo irons. Eastern New York furnaces are maintaining a price of \$18.50 a ton on cars, furnace, for No. 2X, and to \$19 or better for No. 1X, while the Mystic Iron Works is meeting their delivered quotations. Western Pennsylvania iron is selling at delivered prices above those of Eastern New York furnaces and the Mystic Iron Works, while Alabama producers are holding firmly at \$17.25 a ton, base Birmingham. New England foundry melt is heavier in some spots and lighter elsewhere, but in the aggregate is not much, if any, greater than heretofore. Foundries are taking iron on schedule, occasionally asking for rush shipment of one or two cars for mixture purposes. During the past week 800 tons of New York State basic was received by the Washburn Wire Co., Phillipsdale, R. I. This was the first barge lot of iron received at Providence, R. I., in several months. New England foundries generally are said to be well covered for the remainder of 1927. Some, however, are privately negotiating for round tonnages.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	\$21.41 to \$21.91
Buffalo, sil. 2.25 to 2.75	21.91 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.96 to 26.21
Virginia, sil. 2.25 to 2.75	26.46 to 26.71
Alabama, sil. 1.75 to 2.25	24.16 to 26.02
Alabama, sil. 2.25 to 2.75	24.66 to 26.52

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Imports.—During September 1005 tons of Indian and 234 tons of Dutch iron, a total of 1239 tons, were received at this port, which compares with 2262 tons imported in August, this year, and 2805 tons, in September, last year. Imports of ore in September aggregated 25,805 tons, made up of 7900 tons from Bizerta, 8850 tons from Bona and 9055 tons from Newfoundland. Ore imports in August, this year, were 34,227 tons, and in September, last year, 17,802 tons. September receipts of cast iron pipe were 550 pieces. No pipe was imported in August.

Shapes, Plates and Bars.—Mill prices on shapes, plates and bars are holding. Large tonnages of standard shapes are bringing 1.75c. per lb., base Pittsburgh, while small lots are going at 1.80c. and 1.85c. Bars are steady at 1.75c., and plates at 1.75c. to 1.80c., depending on the tonnage bought. Fabricators of steel are pressed with requests for estimates on small tonnages, but there is a real scarcity of large tonnages in the market.

Reinforcing Bars.—The market for reinforcing bars is more active than it has been for some time. Several round tonnages have been awarded and are up for figuring, as well as scores of small jobs. Sellers are se-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

curing 2.70c. per lb. from stock more often than they were a month ago, but some low prices were made on the most attractive tonnages recently booked.

Coke.—As intimated a week ago, the October price for New England by-product foundry coke on last half contracts will be \$12 a ton, delivered, within a \$3.10 freight rate zone, or the same price that ruled last month. Shipments by both producers are not much, if any, greater than they were a month ago, and demand for domestic fuel is well below expectations because of unseasonably warm weather. Connellsville foundry coke makers have not advanced prices, as previously announced. Good fuel will be available in New England until Oct. 15, at least, at \$4.75 to \$5 a ton on cars, Connellsville, or \$10.29 to \$10.54, delivered. Sales in the past week were confined to a few stray cars.

Old Material.—While average prices quoted by local brokers are virtually the same as a week ago, the market for certain materials, at least, appears softer. The lack of large tonnages in the market, however, prevents a test of prices. Steel mills are getting along with a surprisingly small amount of New England scrap. Current activity is confined very largely to steel turnings, steel mill borings, bundled skeleton, heavy melting steel and forge scrap, mostly in car lots. The market for chemical borings is dull, and consumers have notified brokers to hold up shipments.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$9.00 to \$9.50
Scrap rails	8.50 to 8.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.50 to 7.00
Bundled skeleton, long	6.00 to 6.50
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.00
Forged scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Street car axles	17.00 to 17.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.25 to 10.75
Cast iron borings, chemical	10.00 to 10.50

Prices per gross ton delivered consumers' yards:

Textile cast	\$15.00 to \$15.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.00 to 14.50

Cincinnati

Further Concessions in Lake Pig Iron Prices—Scrap Grows Still Weaker

CINCINNATI, Oct. 4.—The opening of the fourth quarter has failed to bring out any important sales or inquiries in the pig iron market, which remains quiet. Consumers are accepting shipments on contract at a fairly good rate, but forward buying is practically at a standstill. Northern Ohio furnaces continue to dominate the market in southern Ohio and in central Indiana, and current reports indicate that prices as low as \$16.50, base Cleveland, have been made in certain instances. In the Ironton district producers are refusing to accept orders under \$19, base furnace, contending that manufacturing costs prevent the lowering of quotations. Sellers in the South are adhering firmly to

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	\$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

\$17.25, base Birmingham, and Jackson County silvery iron is being maintained on a steady basis. The purchase of about 700 tons of foundry and charcoal iron by the Louisville & Nashville has been the only important transaction of the past week. The Norton Iron Works Co. at Ashland, Ky., blew out its Norton furnace Sept. 22 in order to install a skiphoist and to make other improvements which probably will be completed by Jan. 1. The Belfont Steel & Wire Co., at Ironton, has put its Belfont stack into blast. The Andrews Steel Co. is in the market for 300 tons of ferromanganese.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	20.94
Alabama fdy., sil. 2.25 to 2.75....	21.44
Tennessee fdy., sil. 1.75 to 2.25..	20.94
Southern Ohio silvery, 8 per cent	30.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Signs of improvement are still lacking, and producers are finding it impossible to secure sufficient tonnage to increase operations. With the price trend somewhat uncertain, consumers are postponing buying any material except that which they must have for immediate use. Mills are able to supply many products in less than a week, the ability to make such quick deliveries having militated against the placing of future orders. Jobbers are carrying just enough material to have well rounded stocks, and consequently are purchasing frequently in small quantities. Mill prices on bars, shapes and plates are holding none too well. Buyers of lots ranging from 100 tons upward are paying 1.75c., base Pittsburgh, while single carload sales are being made at 1.80c. to 1.85c. There is great resistance to the quotation of 1.85c., and it prevails in only a few instances. Among the large consumers an attempt has been made to obtain 1.70c., but this has not been successful. Galvanized sheets are firm at 3.85c., base Pittsburgh, blue annealed at 2.25c. and black at 3c. Common wire nails are being offered at \$2.69 a keg, delivered Cincinnati, and plain wire at \$2.54 per 100 lb., delivered in this city.

Coke.—During October there will be no change in the price of by-product foundry coke, which stands at \$7.50, f.o.b. ovens, or \$9.52, delivered Cincinnati. Domestic walnut and No. 2 nut, however, have advanced 50c. a ton to \$5 and \$4.50, ovens, respectively, but egg size will remain at \$5.50, ovens. In Michigan by-product foundry coke is selling at \$9.75, delivered in Detroit, and at \$9, Detroit ovens, for outside shipment. Domestic egg coke is quoted at \$7.50, Detroit ovens, and nut size at \$6, ovens. For local delivery 50c. a ton is added.

Foundry coke prices per net ton, delivered Cincinnati: By-products coke, \$5.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—Weakness continues in the scrap market, which is sluggish. Steel mill grades are moving slowly, and there is little hope for an improvement in the immediate future. Foundries are making a few scattered purchases, which in the aggregate total only a small tonnage. Prices reflect the depression in activity, several items having declined from 25c. to 50c.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	\$11.75 to \$12.25
Scrap rails for melting	12.75 to 13.25
Loose sheet clippings	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	13.50 to 14.00
No. 1 railroad wrought	11.00 to 11.50
Short rails	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	16.50 to 17.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	8.00 to 8.50
Stove plate	9.50 to 10.00
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Reinforcing Bars.—Two jobs, one calling for 250 tons for the American Druggists Fire Insurance Association building in this city and the other for 300 tons for approaches to the Chesapeake & Ohio bridge across the Ohio River at Cincinnati, are expected to be let during the coming week. New billet bars are quoted at 1.75c. to 1.85c., base Pittsburgh, and rail steel stock at 1.65c. to 1.75c., base mill.

Buffalo

Wire Mills Running at Good Rate— Pig Iron Unusually Dull

BUFFALO, Oct. 4.—The past week was one of the quietest in the history of the local pig iron market. Buying and inquiries are at a minimum, though sellers believe that there is still considerable iron to be bought for the last quarter. An inquiry for 500 tons of foundry iron is apparently the only outstanding lot pending. All sellers are now quoting \$17, base furnace, for foundry grade and \$17.50 for malleable, and with producers fortified by comfortable backlogs, these prices promise to prevail for some time.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25...	\$16.50 to \$17.00
No. 2X foundry, sil. 2.25 to 2.75...	17.00 to 17.50
No. 1X foundry, sil. 2.75 to 3.25...	18.00 to 18.50
Malleable, sil. up to 2.25	16.50 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—The wire-making industry is running at a high rate, with active demand for most lines of wire products. A Buffalo maker is operating its open-hearth furnaces at 75 per cent of capacity and its rolling mills at virtually 100 per cent. Sheet mills are operating well, and bar mills are operating at around 70 per cent. Mill prices on bars and shapes are steady. The reinforcing bar market is quiet. Foundations for the Buffalo city hall will require 300 tons of concrete bars. The structural steel for the new city court building is believed to have been placed with a Buffalo fabricator.

Old Material.—Buying is limited to dealers, some of whom are paying \$15, or more, for heavy melting steel to fill orders booked at \$15.50. One mill is receiving shipments on orders for this material placed at \$15. On a railroad list closed last week the heavy melting steel brought more than \$15, seller's tracks, or \$15.25, delivered consumer's tracks, Buffalo. Bids are now being submitted on three lists that close this week. No. 1 machinery cast and stove plate have declined, with the two principal consumers out of the market. No. 1 machinery cast is now quotable at \$14.75 to \$15.25, and stove plate at \$13.25 to \$13.75.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$14.75 to \$15.00
No. 2 heavy melting steel	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets	12.25 to 12.50
Hand-bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers ..	15.75 to 16.25
Railroad coil and leaf springs ..	17.00 to 17.50
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings ..	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings ..	10.75 to 11.00
Short mixed borings and turnings ..	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	14.75 to 15.25
Stove plate	13.25 to 13.75
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

NON-FERROUS METAL MARKETS

The Week's Prices		Oct. 4	Oct. 3	Oct. 1	Sept. 30	Sept. 29	Sept. 28
Cents per Pound for Early Delivery	Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25	13.25
	Electrolytic copper, N. Y.* ..	13.00	12.87½	12.75	12.75	12.75	12.75
	Straits tin, spot, N. Y.	59.50	59.25	59.00	57.75	58.75	58.75
	Lead, New York.....	6.25	6.25	6.25	6.25	6.25	6.25
	Lead, St. Louis.....	6.00	6.00	6.00	6.00	6.00	6.00
	Zinc, New York.....	6.35	6.35	6.40	6.40	6.42½	6.47½
	Zinc, St. Louis.....	6.00	6.00	6.05	6.05	6.07½	6.12½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Oct. 4.—Tin has been the most active market with prices seeking low levels and then rebounding. The copper market is stronger with inquiry more active. Conditions in lead have changed but little and zinc has gone to lower levels, with demand for both metals light. Antimony is a little higher.

Copper.—Interest in the market had been very sluggish until yesterday when inquiry by consumers became more active. This was accompanied by the disappearance of the small amounts of metal which had been available for the last week or two as low as 13c., delivered in the Connecticut Valley. Yesterday some electrolytic copper was available at 13.12½c., delivered, but today it was difficult to buy any metal under 13.25c., delivered, which was the quotation of practically all sellers. Domestic consumers are still buying but little. The mainspring of the market at present is the activity of buyers from the other side. Consumers in the leading foreign centers are already starting to buy and it is stated they must purchase considerable metal for October. Producers here look for fairly large foreign purchases very shortly which, as in the past, may result in a more active market here. The market is firm here today at 13.25c., delivered, with Lake copper quoted also at 13.25c.

Copper Averages.—The average price of Lake copper for the month of September, based on daily quotations in THE IRON AGE, was 13.25c. The average price of electrolytic copper was 12.93c., refinery, or 13.18c., delivered in the Connecticut valley.

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig.....	60.50c. to 61.50c.
Tin, bar	62.50c. to 63.50c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig.....	7.50c. to 8.50c.
Lead, bar	9.75c. to 10.75c.
Antimony, Asiatic	12.00c. to 13.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) ..	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy ..	26.00c. to 27.00c.
Babbitt metal, commercial grade ..	30.00c. to 40.00c.
Solder, ½ and ¼	39.50c. to 40.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	64.00c.
Tin, bar	66.00c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	7.75c.
Lead, American pig.....	7.25c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade.....	19.50c.
Babbitt metal, high grade.....	67.25c.
Solder, ½ and ¼	37.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled.....	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier ..	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes.....	26.25c. to 27.25c.
Brass rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks.....	10.50c. to 11.00c.
Zinc sheets, open.....	11.00c. to 11.25c.

Tin.—Last week was one of the most active in a long time, sales for the period ended with Saturday, Oct. 1, having been over 1500 tons. The transactions were divided about as follows: 400 tons on Sept. 26, 250 tons on Sept. 27, over 700 tons on Sept. 28 and about 150 tons on Sept. 29. On the most active day, Sept. 28, consumers were very heavy purchasers, buying for delivery into next year, with one or two sales as far ahead as June. In the afternoon of that day, consumers stopped buying and dealers started in. On Sept. 30 dealers became frightened and started to cut prices so that the metal fell to 57.75c., New York, the total sales being about 400 tons. On Saturday the market turned very strong, due to a report that the decrease in the world's visible supply would be much less than expected. On that day there were more buyers than sellers. Yesterday, Monday, a good business was done with dealers covering up short sales. Today moderate activity is reported with spot Straits tin quoted at 59.50c., New York. Prices at London today were higher than a week ago, with spot standard quoted at £269 5s., future standard at £266 15s. and spot Straits at £275 5s. The Singapore price today was £271 5s. Deliveries into consumption in September were 6110 gross tons, with 1973 tons in stock and landing on Sept. 30.

Lead.—The situation has changed but little and quotations remain at 6c., St. Louis, in the outside market with the contract price of the leading interest unchanged at 6.25c., New York. The expectation that the low London prices would cause a drop here has not been realized. Producers are comfortably booked for October and the market is quiet and fairly firm.

Zinc.—Weakness, which developed last week, became intensified this week and prime Western zinc is quoted today at 6c. to 6.02½c., St. Louis, or 6.35c. to 6.37½c., New York. Considerable resistance has de-

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are still holding at the advances of Aug. 3. Zinc sheets and lead full sheets have not changed since Aug. 5 and Sept. 9 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to
75c. per 100 Lb. Allowed on Shipments
of 500 Lb. or Over

Sheets—	
High brass	18.25c.
Copper, hot rolled.....	22.00c.
Zinc	10.00c.
Lead (full sheets).....	10.00c. to 10.25c.

Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.

Rods—	
High brass	16.00c.
Naval brass	18.75c.

Wire—	
Copper	15.25c.
High brass	18.75c.
Copper in Rolls.....	21.00c.
Brazed Brass Tubing.....	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	10.00c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

veloped on the part of producers and it is felt that 6c. is the bottom. It is understood, however, that from one source 5.95c., St. Louis, could be done today. Sales both during the week and today have been in moderate volume, some fair tonnages having been sold today at 6c. to 6.02½c. Ore prices have declined further to \$38 per ton, Joplin, with production last week at about 15,000 tons and sales at around 11,500. Specifications on contract are reported quite satisfactory.

Antimony.—Chinese metal for all positions is a little stronger at 11c., New York duty paid, with demand only moderate.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 4.—There is little activity. Prices lack strength and zinc and tin are quoted lower than a week ago. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 13.35c.; tin, 59.50c.; lead, 6.10c.; zinc, 6.15c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

RAILROAD EQUIPMENT

Inquiry for 250 Hopper Car Bodies—Fair Total of Miscellaneous Purchases

An inquiry for 250 hopper car bodies from the Chicago, St. Paul, Minneapolis & Omaha is outstanding in the week's equipment business. Several miscellaneous orders and inquiries seem to show a slight improvement in the business. Items in detail follow.

The Winston-Salem Southbound is inquiring for eight all-steel or composite caboose cars and one locomotive tender. The Chicago, Burlington & Quincy has made inquiry for 26 gas-electric rail motor cars.

The Detroit & Toledo Shore Line has purchased four eight-wheel switching locomotives from the American Locomotive Co.

The Norfolk & Western will build 250 all-steel automobile box cars at its Roanoke shops.

The Georgia & Florida is inquiring for four 70- or 60-ft. coaches, two combination passenger and baggage cars and five combination passenger, baggage and mail cars.

The Lehigh Coal & Navigation Co. has ordered one 30-yard extension side dump car from the Clark Car Co.

The American Steel & Wire Co. has placed an order for 20 30-yard extension side dump cars with the Clark Car Co.

The Otis Steel Co. has purchased three 30-yard extension side dump cars from the Clark Car Co.

The Solvay Process Co. has ordered 30 Class V tank cars and five 30-ton multi-tank cars from the American Car & Foundry Co.

The Chicago, St. Paul, Minneapolis & Omaha will buy 250 hopper car bodies.

Johnson & Hoehler, Fernwood, Pa., have inquiries out for two gasoline locomotives, about 6 tons capacity each, and a number of side-type dump cars, 4 to 6-yd. capacity, 36-in. gage.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	9.00c.	10.25c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

REINFORCING STEEL

Awards of 7400 Tons Include Several Large Projects—3600 Tons in Pending Work

Included in the 7400 tons of concrete reinforcing bars reported let in the last week were a factory building at Jersey City requiring 1350 tons, a bridge at Cleveland taking 1200 tons and a sewage disposal plant at Allentown, Pa., calling for 1000 tons. New work pending which aggregated 3600 tons included 2700 tons in addition to 5000 tons previously reported for a St. Louis sewerage project. Awards follow:

PHILADELPHIA, 250 tons, Helleman Street sewer, to Davis Brothers.

PROVIDENCE, 150 tons, theater, to McClintic-Marshall Co.

POUGHKEEPSIE, N. Y., 110 tons, factory building for Reym Realty Co., to McClintic-Marshall Co.

JERSEY CITY, 1350 tons, factory building for American Can Co., to McClintic-Marshall Co.

PERTH AMBOY, N. J., 300 tons, approaches to Staten Island bridges, to Kalman Steel Co.

ALLENTOWN, PA., 1000 tons, sewage disposal plant, to Concrete Steel Co.

DETROIT, 800 tons, Detroit River bridge, to McClintic-Marshall Co.

CLEVELAND, 1200 tons, Eagle Avenue bridge for Cleveland Union Terminals Co., to Pattison-Leitch Co.

BOSTON, 600 tons, Gainsboro Street garage, to Concrete Steel Co.

BOSTON, 400 tons, Hyde Park district high school, to Joseph T. Ryerson & Son, Inc., Boston.

NEWTON, MASS., 125 tons, hospital, to Barker Steel Co.

BOSTON, 125 tons, Burdett Business College, to Morrison-Stevens Co., Boston.

WELLESLEY, MASS., 100 tons, college unit, to Barker Steel Co.

CHICAGO, 600 tons, Sleepy Hollow Cemetery, to Concrete Engineering Co.

CHICAGO, 185 tons, distribution tunnel for Commonwealth Edison Co., to Jones & Laughlin Steel Corporation.

OAKLAND, CAL., 100 tons, music building at Mills College, to Frederick Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CAMBRIDGE, MASS., 125 tons, city home.

BOSTON, 100 tons, officers' quarters at City Hospital.

FREEMONT, ILL., 100 tons, Masonic Temple.

ROCK ISLAND, ILL., 100 tons, building for the Royal Neighbors.

CHICAGO, tonnage being estimated, factory for James S. Kirk & Co.

CHICAGO, 100 tons, hotel at 6311 Drexel Boulevard.

ST. LOUIS, 7700 tons, previously reported as 5000 tons, second unit of River Des Peres sewer project; Whitmire Construction Co., Kansas City, low bidder on general contract.

PISMO, CAL., 257 tons, paving work; bids opened.

REDLANDS, CAL., 137 tons, paving work; bids opened.

SACRAMENTO, CAL., 128 tons, culverts for the State; bids Oct. 24.

LAMOINE, CAL., 104 tons, Pollard Creek bridge; bids Oct. 24.

The St. Louis Gas & Coke Corporation, Granite City, Ill., suffered a loss of six men, plant damage estimated at \$60,000 and a 24-hr. interruption to production as a result of the recent tornado in St. Louis and vicinity. The principal plant damage was to the cast house.

PERSONAL

Sir Dorabji J. Tata, chairman of the Tata Iron & Steel Co., the Tata Hydro-electric Co., the Empress Cotton Mills, the Central Indian Spinning Co. and other industrial corporations of India, is now spending a few months in the United States. On Oct. 4 he was tendered a luncheon by Charles Page Perin of Perin & Marshall, consulting engineers, at the Downtown Club, New York. Among those present were: Howard Elliott, chairman Northern Pacific Railroad; Gerard Swope, president General Electric Co.; John A. Topping, chairman Republic Iron & Steel Co.; Maurice Oudin, vice-president International General Electric Co.; C. A. Alexander, general manager Tata Iron & Steel Co., Ltd.; E. A. S. Clarke, secretary American Iron and Steel Institute; E. P. Thomas, president United States Steel Products Co.; C. M. Weld, consulting engineer, New York; W. W. Macon, THE IRON AGE, New York; H. E. Manville, chairman Johns-Manville Co.; Lewis Nixon, shipbuilder, and F. L. Estep, partner, Perin & Marshall.

Stewart M. Bunting, who until May of this year was associated with the Smith-Booth-Usher Co. at Los Angeles, has established himself in the machine tool business at 111 Broadway, New York. He was identified for more than 25 years with the Niles-Bement-Pond Co., New York, for many years as manager of its miscellaneous department.

Richard Devens, for the last 22 years manager of the New York office of the Brown Hoisting Machinery Co., Cleveland, has resigned, effective Oct. 1. He is at present located at 495 West End Avenue, New York.

George L. Drake has been appointed agency sales supervisor of the Lo-Hed hoist division, American Engineering Co., Philadelphia.

G. C. Shidle, formerly Pittsburgh district sales manager LaBelle Iron Works, now the Steubenville works, Wheeling Steel Corporation, and more recently associated with J. W. Dickson & Co., Pittsburgh, has gone with the Jones & Laughlin Steel Corporation, in its general pipe sales department.

Elmer Gullberg, associated for 13 years with Deere & Co., Moline, Ill., has been appointed manager of the Union Malleable Iron Co., East Moline, succeeding G. Howard Ross, who resigned.

C. A. Alexander, general manager Tata Iron & Steel Co., Ltd., of India, following a sojourn of some weeks in the United States, left New York Oct. 5 for a stay in England and the continent of Europe on his return to India.

W. D. Durst, recently associated with the stock and stores department of the Master Electric Co., Dayton, Ohio, has resigned from that company.

George Thompson, who for the last ten years has been general superintendent and works manager of the Bunting Brass & Bronze Co., Toledo, Ohio, is to be president and general manager in charge of all production of the Thompson-Owens Corporation, Toledo, which has recently been organized to manufacture finished bronze bushings and bearings and brass and bronze castings. J. E. Owens, who is secretary-treasurer and sales manager of the new company, was also formerly connected with the Bunting company, his association having covered a period of 14 years as salesman and sales manager. The new company has acquired a plant, including foundry, at York and Wheeling Streets, and will begin production during the present month.

Harry E. D. Gould, who has been general superin-

tendent of the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., has been made general manager of the plant. He has served respectively as foreman of engineering department of the works, superintendent of machinery and general superintendent.

William H. MacKay Lolley has been made sales manager of a newly created automobile accessories department by the Indian Motorcycle Co., Springfield, Mass. He is a native of London, but has lived in the United States 21 years. Early in life he was associated with the Mercedes automobile company of Germany and later with the Timken Roller Bearing Co., Canton, Ohio, the Timken Detroit Axle Co., Detroit, the Remy Electric Co., Anderson, Ind., and the Standard Parts Co., Cleveland.

H. H. Straus, vice-president Inland Steel Co., Chicago, has recently returned from a six weeks' vacation in Europe.

E. J. Kulas, president Otis Steel Co. Cleveland, sailed for Europe Sept. 30. While abroad he will take a motor trip through Spain.

Howard F. Hudson, a manufacturers' representative and importer of Sydney, Australia, is spending a short time in the United States on his way from Europe to Australia.

Robert S. Miller, formerly with the Seattle Chain Mfg. Co., has been appointed sales manager of the Portland Chain Mfg. Co., St. Johns, Ore.

H. W. Snyder, of the New England Drawn Steel Co., Mansfield, Mass., spoke before the Worcester section of the American Society for Steel Treating, Sept. 30, on the essential processes used in the drawn steel industry.

Stanley S. Holmes, assistant manager of the Hawthorne Works, Western Electric Co., has been made manager of the company's plant at Kearny, N. J. William H. Meese, operating superintendent at the Hawthorne plant, will succeed him. Other changes at the Hawthorne plant include the appointment of John H. Kasley as superintendent of operations, of William L. Robertson as superintendent of manufacturing planning, of George A. Pennock as superintendent of inspection, and of Stanley Bracken as technical superintendent.

American Iron and Steel Institute Program for Oct. 28

For the thirty-second general meeting of the American Iron and Steel Institute, to be held at the Hotel Commodore, New York, Friday, Oct. 28, the following program of technical papers has been prepared by the committee on arrangements consisting of James A. Farrell, chairman, James A. Burden, E. A. S. Clarke, Eugene G. Grace, Charles M. Schwab and John A. Topping:

"Knowles Glow Tubes and Similar Recent Developments," by S. M. Kintner, manager research department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Technological Problems of the Steel Industry," by W. A. Forbes, United States Steel Corporation, New York.

"A Steel Mill Boiler Plant," by D. L. Mekeel, chief engineer, Jones & Laughlin Steel Corporation, Pittsburgh.

"The Evolution of the Wide Strip Mill," by Stephen Badlam, consulting engineer, Pittsburgh.

"Behavior of Coke in the Blast Furnace," by T. L. Joseph, supervising engineer, Bureau of Mines, North-Central Experiment Station, Minneapolis, Minn.

"The Sand Cast Centrifugal Process," by James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

The forenoon session will begin at 10 o'clock and the afternoon session at 2. The banquet in the evening will be at 7 o'clock. An arrangement has been made with the railroads for reduced fares to members attending the meeting. It will become effective in case 250 members deposit validated certificates.

A YEAR'S RESEARCH IN STEEL

Results to Be Presented at a Pittsburgh Meeting on Oct. 18

Last year the Metallurgical Advisory Board to the Bureau of Mines and Carnegie Institute of Technology began a study of the physical chemistry of steel making, with particular reference to non-metallic inclusions in steel, fundamental reactions in steel manufacture and the carburization of steel. Plans were made for a research extending over a period of at least five years.

Twenty-six steel companies have cooperated in the investigation. The research organization consists of six members of the technical staff of the Bureau of Mines, two research metallurgists supported by the Advisory Board, six research fellows of the Carnegie Institute of Technology, and part time of three members of the staff of the institute.

The results of the past year's research are embodied in Bulletin 34 and in the fourth progress report, both of which will be presented at the next meeting. Bulletin 34 covers the solubility of iron oxide in iron over the temperature range 1530 to 1725 deg. C., the application of the results to steel manufacture and some physical properties of the iron-oxygen alloys. The fourth progress report is concerned mainly with the formation and identification of iron silicates in steel, and with the formation and elimination of iron silicates in the basic open-hearth furnace.

The Advisory Board has decided to invite the representative and the chief metallurgist of each cooperating company to attend the next meeting, which is appointed for Oct. 18 at Pittsburgh. At 4 p. m. on that day the visitors will meet at the Bureau of Mines, 4800 Forbes Street, for the purpose of inspecting the metallurgical laboratories where the major part of the research is being conducted. At 5 p. m. inspection will be made at the laboratories of the department of metallurgy and bureau of metallurgical research at the institute. Dinner will be served at 6 p. m. at Carnegie Inn on the campus. The guest of honor will be Dr. John Johnston, director department of research and technology, United States Steel Corporation. Dr. C. H. Herty, Jr., head of the ferrous metallurgical section of the United States Bureau of Mines, will present a progress report on the cooperative research.

Steel Institute Directors Pay Tribute to Judge Gary

A meeting of the directors of the American Iron and Steel Institute, attended by 18 members of the board, was held in New York on Friday, Sept. 30. Though it had been expected that a choice of president would be made at this meeting, in succession to Elbert H. Gary, the election was postponed and adjournment was taken after the adoption of the following tribute to the late president:

"The directors of the American Iron and Steel Institute at their first meeting following the death of Judge Elbert H. Gary, founder and only president of the institute, desire to record their lasting sorrow and their sense of the great loss it has brought to them and to the steel industry.

"During the 19 years since the incorporation of this institute, founded and dedicated by him to the principle of cooperation, he faithfully attended and presided at our meetings with such dignity, such high ideals of business morality, such just consideration of the rights and opinions of others, that we mourn the loss of an old and dear friend rather than of a great industrial leader. No words of ours can add to the notable achievements of Judge Gary.

"His career as business executive, economic statesman, lawyer, and patriotic citizen will gather luster as the years go by; but we who were privileged to know him well will mourn the man who so kindly and wisely guided the deliberations of this board."

The National Exposition of Power and Mechanical Engineering will be held in the Grand Central Palace, New York, Dec. 5 to 10.

OBITUARY

WILLIAM B. GREENE, president Acme-Palmers & DeMooy Foundry Co., Cleveland, and long prominently identified with the foundry industry in that city,

died Sept. 28 after a brief illness. He was 65 years of age. Mr. Greene was born in Lisbon, Ohio, and located in Cleveland in 1898 when he became secretary-treasurer of the Palmers & DeMooy Foundry Co. In 1919 he became president of the company that was formed by the merger of the Acme Foundry Co. and the Palmers & DeMooy Foundry Co. under the present name. He was at one time president of the Cleveland Founders Association and was for several terms chairman of the Ohio district of the National Founders Association. He was also a member of the board of governors of the American Plan Association of Cleveland. His other business connections included membership on the board of the Ohio Electric & Controller Co., Cleveland.



WILLIAM B. GREENE

CHARLES FREDERICK QUINCY, chairman of the Q & C Packing & Lubricator Co., 90 West Street, New York, for many years connected with the manufacture of railroad supplies, died Oct. 2 at his summer home in Center Harbor, N. H., of heart disease. Though he was not a college graduate and did not receive an engineer's degree, his activities as a manufacturer in the engineering field were recognized by his election to the American Society of Civil Engineers, American Society of Mechanical Engineers, and the American Institute of Mining and Metallurgical Engineers. He was one of the founders in 1887 of the Q & C Co., of which he was president until 1926, when he retired and was made chairman of the board. He was born in Newton, Mass., 71 years ago. Surviving him are Mrs. Quincy, two daughters and two sons, Edmund and Roger Bradshaw Quincy.

Coal Strike Ended in Illinois

An agreement reached at Chicago on Oct. 1 between coal mine operators in Illinois and the United Mine Workers of America has resulted in a settlement of the strike that was called April 1, 1927. Preparations are under way to open approximately 225 Illinois mines which will provide employment for more than 70,000 miners. Work will be resumed this week at the Jacksonville rate of \$7.50 a day, for which the men have contended, and a truce will exist until April 1, 1928.

The agreement further provides for the establishment of a joint commission of two operators and two union representatives of the Illinois miners. This commission is empowered to launch an immediate investigation of all demands, claims and contentions of the operators and mine workers. A report of this investigation will be made, with recommendations, to a joint wage scale committee meeting to be held in Chicago on Feb. 7, 1928. The basis of the report, it is specified, shall become the groundwork of the ensuing wage agreement which will become effective in April, 1928. To facilitate the agreement on disputed points the commission may enlarge its number to five, in which case a majority vote shall be binding.

Operators in Pennsylvania and Ohio, a number of whom have started their mines with non-union labor, say that there is no prospect of any such arrangement in those States as has been agreed to in Illinois.

Machinery Markets and News of the Works

INQUIRY IN LARGER VOLUME

Amount Before Trade Gives Promise of Improvement in Bookings

Milwaukee Manufacturer to Buy 25 or More Tools—Nash Motors Also Expected to Purchase

ALTHOUGH bookings of machine tools have been moderate, more interest is being shown in new equipment. Because of the volume of inquiry before the trade, it is expected that more business will be placed during October than in any of the three preceding months. Some machine tool builders in the Cincinnati district report better business in September than in August, but the majority say that the past month was one of the poorest of the year.

Machine tools sold during the Machine Tool Builders Exposition in Cleveland, Sept. 19 to 23, are estimated at about 400. In addition, a large amount of prospective business was developed, as previously noted in these columns.

Orders being placed are for the most part for single

tools and from widely scattered sources. There has been little buying by the automotive industry. Several railroads are making up their budgets for the coming year and are expected to place some, although not sizable, orders during November.

Bids are being taken for 25 or more tools, including a number of lathes and shapers, by the A. O. Smith Corporation, Milwaukee. The Nash Motors Co. is increasing the capacity of its Racine, Wis., plant and will require additional equipment. The same company is also expected in the market for replacement tools for its Milwaukee plant.

New equipment is being selected for the Moline, Ill., plant of the International Harvester Co. The J. I. Case Threshing Machine Co., Racine, Wis., has placed several orders against its list. The fourth quarter list of the Westinghouse Electric & Mfg. Co. contains a large number of miscellaneous items but comparatively few machine tools.

Business in prospect includes equipment for a trades high school to be erected next year by the Pittsburgh Board of Education. This is to be one of the most complete schools of its kind and undoubtedly will call for a large number of tools.

New York

NEW YORK, Oct. 4.

MACHINE tool business is slightly more active, but there has been no important gain in the volume of buying. The activity arises chiefly from a greater number of inquiries. Results of the National Machine Tool Exposition in Cleveland have made themselves felt in a small way. Not a great deal of business was closed at the show by machine tool men from this district who attended, but a good many prospects were developed. Among the sales of the past week were a 13 x 30-in. lathe to a machine company at Springfield, Vt., a 16 x 60-in lathe to a company at Manhattan Beach, Cal., and a 13 x 30-in. lathe to the Leland Stanford University in California.

Bids are being asked by the Intertype Corporation, 300 Furman Street, Brooklyn, manufacturer of typesetting machines and parts, until Oct. 15 for its new plant at Harrison, N. Y., to cost in excess of \$400,000 with machinery. The Ballinger Co., 100 East Forty-second Street, New York, is architect and engineer.

In connection with its general operations, the Mathieson Alkali Works, Inc., 250 Park Avenue, New York, is arranging facilities for cement production and has selected a tract of land at its soda ash plant at Saltville, Va., as site for a new cement mill, for which plans will be completed soon. It will be equipped for an initial rating of about 1,000,000 bbl. per annum, and is reported to cost close to \$2,000,000 with machinery. The company has work in progress on a general expansion and improvement program at the Saltville plant, including the installation of equipment for replacement of obsolete machinery and for increase in former output.

The Ambart Garage, Inc., 938 Hancock Street, Brooklyn, has plans for a new three-story service, repair and garage building reported to cost close to \$100,000 with equipment.

The Yellow Taxi Corporation, 419 East Sixtieth Street, New York, has arranged for a lease of property on Fifty-eighth Street, near Twelfth Avenue, 104 x 200 ft., and will

soon have plans prepared for a three-story service, repair and garage building, to cost more than \$125,000 with equipment.

The Board of Education, Yonkers, N. Y., has plans nearing completion for a two-story addition to its Saunders trade and vocational school to cost more than \$125,000. It is expected to ask bids in December. G. H. Chamberlain, 18 South Broadway, is architect.

The Department of Public Works, Division of Highways, Albany, N. Y., will soon begin the construction of two two-story additions to its automobile service, repair and garage building near Poughkeepsie, N. Y., for State motor trucks and cars, to cost in excess of \$85,000. Additional tools and equipment will be installed.

The Spruce Falls Power & Paper Co., operated jointly by the New York Times, Times Square, New York, and the Kimberly Clark Co., Neenah, Wis., will soon proceed with superstructure for its proposed pulp and paper mill at Kapuskasing, Ont., to have a capacity of 550 tons of newsprint per day. The newspaper will secure its supply of paper, totaling 90,000 tons per annum, from this source. The project will include a hydroelectric generating plant on the Matagami River at Smoky Falls, Ont., about 50 miles distant, with power line to the mill site. The entire project will cost in excess of \$4,500,000. George F. Hardy, 309 Broadway, New York, is engineer.

The United Electric Light & Power Co., Irving Place and Fifteenth Street, New York, will carry out an expansion program at its Hell Gate steam-operated electric generating plant, with installation of new 165,000-kw. turbo-generator and auxiliary equipment. Contracts for primary equipment are being let, and awards for accessory machinery will be made at an early date.

Sidney H. Kitzler, 600 West 181st Street, New York, architect, has completed plans for a new two-story automobile service, repair and garage building, 100 x 150 ft., to cost about \$100,000 with equipment.

The Huff Airplane Co., Inc., Pardee tract, Perth Amboy, N. J., recently formed to construct and operate a local plant, is completing plans for the initial unit, to be one-story T-shaped, reported to cost more than \$45,000 with equipment. Thomas H. Huff, formerly identified with the Huff-Leland Aircraft organization, Bristol, Pa., is president.

The International Combustion Engineering Corporation, 200 Madison Avenue, New York, has plans maturing for a proposed new low temperature fuel carbonization plant on site recently selected at New Brunswick, N. J. The plant will be constructed under German patents and will have a capacity for handling approximately 250,000 tons of bituminous slack coal per annum; it will consist of eight units and is reported to cost in excess of \$1,500,000. The by-product output will include about 6,000,000 gal. of coal tar per year and 1,250,000 gal. of crude motor oil, in addition to about 10,000,000 cu. ft. of artificial gas per annum, all of which has been contracted for by the Public Service Electric & Gas Corporation, Public Service Terminal, Newark, N. J.

The Vulcanite Portland Cement Co., Vulcanite, N. J., is carrying out an expansion and improvement program at its local mill, with the installation of additional equipment for the production of "super" cement, to be manufactured under special license.

The Mallon Motor Car Co., 298 Washington Street, Newark, N. J., local representative for the Oakland and Pontiac automobiles, has leased a one-story building at 46-54 Earl Street, aggregating 25,000 sq. ft. of floor space, for a new service, repair and mechanical works, including parts department.

Philadelphia

PHILADELPHIA, Oct. 3.

CONTRACT has been let by the Wilkinson Equipment Co., 1011 Chestnut Street, Philadelphia, manufacturer of filing cabinets, etc., to the William Steele & Sons Co., 124 North Fifteenth Street, for a new one-story plant, to cost about \$24,000 with equipment.

The Roberts-Nash Motor Co., 1235 North Broad Street, Philadelphia, representative for the Nash automobile, has filed plans for a five-story addition to its service, repair and mechanical department, to cost about \$150,000 with equipment. Philip S. Tyre, 114 South Fifteenth Street, is architect.

The Philadelphia Rapid Transit Co., Broad and Locust Streets, Philadelphia, will soon break ground for a two-story car repair shop and reconditioning unit, 55 x 225 ft. A new one-story structure will also be built, 36 x 60 ft., and extensions and improvements made in the boiler plant. The entire project will cost about \$125,000, including equipment.

The Rittenhouse Motor Car Co., Greene Street and Cheltenham Avenue, Philadelphia, representative for the Packard automobile, has taken title to a plot of ground at Rittenhouse and Marion Streets, 70 x 170 ft., for \$50,000, and plans the early erection of a new service and repair building, to cost in excess of \$125,000 with equipment. The work will be carried out in conjunction with similar expansion, previously noted, at Cheltenham and Ogontz Avenues, to cost approximately \$200,000.

The J. G. Brill Co., Sixty-second Street and Woodland Avenue, Philadelphia, manufacturer of street railroad cars, trucks, bolsters, etc., is completing plans for expansion in output, to include the production of steel diners or lunch cars. A portion of the Wason Works at Springfield, Mass., will be given over to this new line of manufacture, as well as a section of the Kuhlman Works at Cleveland. Both of these branch plants will also continue in their regular line of electric railroad car building.

The South Jersey Port Commission and the Board of City Commissioners, Camden, N. J., are completing plans for a new marine terminal on the Delaware River. The work will include the construction of piers, with group of terminal buildings, initial unit to cost approximately \$2,000,000. A main terminal unit, 100 x 400 ft., will be built, provided with traveling cranes, conveying machinery and other handling equipment. A railroad yard will also be constructed. A bond issue in amount noted will be placed before voters at the general election in November for ratification. Six additional piers and other warehouse terminal buildings will be erected later. Upton S. Jefferys is secretary of the port commission; Charles W. Staniford, 50 Church Street, New York, is consulting engineer for the commission.

The Reading Co., Reading Terminal, Philadelphia, will soon begin the construction of a new engine house with repair facilities at its shops at Cressona, Pa.; a storehouse and other buildings will also be erected. The entire project is reported to cost in excess of \$85,000 with equipment. Clark Dillenbeck is company engineer.

The J. Frank Darling Co., 219 Thirty-sixth Street, Brooklyn, N. Y., manufacturer of flooring, is completing the erection of its new plant on a 25-acre tract at Wilmington, Del. The works will cost more than \$400,000 and will include storage and distributing facilities.

The Penn Optical Co., 224 South Eighth Street, Reading, Pa., manufacturer of eye-glass frames and other optical goods, has awarded a general contract to Reider & McLaughlin, 1504 Alsace Road, for a two-story addition,

27 x 33 ft., to cost about \$40,000 with equipment. F. A. Muhlenberg, Ganster Building, is architect.

The Hegins Township School District, Hegins, Pa., plans the installation of manual training equipment in a proposed two-story high school at Valley View, Pa., to cost \$200,000, for which bids are being asked on a general contract. Ritcher & Eller, 147 North Fifth Street, Reading, Pa., are architects.

The Pennsylvania Water & Power Co., Holtwood, Pa., affiliated with the Consolidated Gas, Electric Light & Power Co., Baltimore, is reported to be projecting plans for a new hydroelectric generating plant on the Susquehanna River, about 15 miles south of the existing station at Holtwood. The project will include the construction of a transmission line to the Baltimore district, where power will be furnished the parent company. The entire cost will amount to more than \$15,000,000.

The Salem Hill Gravel & Sand Co., Beach Haven, Pa., has approved plans for the complete electrification of its plant. Additional equipment will also be installed.

Buffalo

BUFFALO, Oct. 3.

THE St. Lawrence Utilities Co., Ogdensburg, N. Y., has plans in progress for a new electric generating plant on the Oswegatchie River, a few miles south of the city, to cost in excess of \$80,000 with equipment. Transmission lines will be extended.

A merger is being arranged by the Niagara, Lockport & Ontario Power Co., Lockport, N. Y., and the Western New York Utilities Co., Batavia, N. Y., and vicinity, under the first noted name. The consolidated organization plans extensions and improvements in power facilities, including transmission line construction.

The Board of Education, Chappaqua, N. Y., plans the installation of manual training equipment in a proposed new grade and high school to cost \$325,000, for which bids will soon be asked on a general contract. Mann & MacNelle, 70 East Forty-fifth Street, New York, are architects.

The Lake Ontario Power Corporation, Sodus, N. Y., is arranging for a merger of the Sodus Gas & Electric Light Co., Sodus; the Marion Power Co., Marion, and the Northern Cayuga Light & Power Corporation, Cato, N. Y. In connection with the application for permission, request is made for authority to construct new electric power plants and transmission lines, with the sale of company stocks to provide in part for this expansion.

The Board of Trustees, School District No. 17, Honeoye Falls, N. Y., contemplates the installation of manual training equipment in a proposed three-story high school to cost \$200,000, for which bids will be asked soon on a general contract. A. W. & H. B. Dryer, 217 East Avenue, Rochester, N. Y., are architects.

New England

BOSTON, Oct. 3.

SEPTEMBER was a lean month with New England machine tool dealers. Orders taken by manufacturers of equipment at the exposition in Cleveland did much to improve the outlook and there are numerous additional prospects as a result of the exposition, which give indication of closing this month. Local sales the past week were few and consisted largely of new tools. The most important were two jig boring machines to two Providence shops, and a 900-lb. pneumatic drop hammer, a repeat order, from an Indiana manufacturer. Business in used tools is practically at a standstill; prospective buyers, in almost every case, want dealers to take obsolete machinery in part or whole payment. Small tools are selling better than a month ago.

The Warren Telechem Co., Ashland, Mass., is completing a shop which will practically double its production capacity.

The Crompton & Knowles Loom Works, Worcester, Mass., will soon start a mill addition, 45 x 64 ft. Plans are private.

The Leominster Electric Light & Power Co., 46 Main Street, Leominster, Mass., contemplates the erection of a coal pocket for which hoisting and other mechanical equipment will be required. Plans are private.

The Indian Motorcycle Co., Springfield, Mass., is equipping its plant for the manufacture of an automobile shock absorber, and plans the production of other automobile accessories, independent of the production of motorcycles.

The Industrial Tube Co., 35 Lane Street, Waltham, Mass., has awarded a general contract to J. C. Esterbill, 106 Buttonwood Street, Dorchester, Mass., for a one-story addition, 25 x 175 ft., including alterations in present plant, to cost

The Crane Market

THERE is only a small volume of inquiry for either overhead or locomotive cranes. Practically all the business in prospect is confined to single pieces of equipment.

Among recent purchases are:

Asano Bussan & Co., 165 Broadway, New York, a 25-ton locomotive crane for the Imperial Government Railways in Japan, from the Browning Crane Co.

Panama Canal Commission, Washington, D. C., a 20-ton locomotive crane for use on the canal, from the Browning Crane Co.

Stone & Webster, Inc., Boston, a 15-ton crawl-tread

locomotive crane for Hopewell, Va., from an unnamed builder.

Phoenix Utility Co., 71 Broadway, New York, a 25-ton, 21-ft. 8-in. span 1-motor crane and a hoist from the Chisholm-Moore Mfg. Co. and a 60-ton crane trolley from the American Crane Co.

Baldwin Locomotive Works, Eddystone, Pa., a 5-ton, 55-ft. 11½-in. span electric crane from the Niles Crane Corporation.

City of Jacksonville, Fla., a 60-ton, 56-ft. 5-in. span overhead crane with 30-ton auxiliary from the Niles Crane Corporation.

\$40,000. Additional equipment will be installed. H. J. Lanson is in charge.

The Packard-Bridgeport Motors, Inc., 170 Cannon Street, Bridgeport, Conn., local representative for the Packard automobile, has awarded a general contract to the T. J. Pardy Construction Co., Seaview Avenue, for a new service, repair and sales building. One section, covering machine repair and mechanical divisions, parts department, etc., will be two-stories, 134 x 134 ft. The sales building will be two-stories, 84 x 101 ft. The cost is estimated in excess of \$125,000 with equipment.

The Acme Apparatus Corporation, Cambridge, Mass., recently formed to take over and expand the Acme Apparatus Co., with local plant at 37 Osborne Street, manufacturer of electrical transformers and other electrical devices and equipment, has arranged for a preferred stock issue of \$400,000, a portion of the proceeds to be used for expansion.

The Lewis-Shepard Co., 124 Walnut Street, Watertown, Mass., manufacturer of portable elevators, lift trucks, etc., has filed plans for a one-story addition, 65 x 160 ft., to cost more than \$50,000 with equipment.

A merger has been arranged between the Aetna Automatic Oil Burner, Inc., Providence, R. I., and the American Nokol Co., 215 North Michigan Avenue, Chicago, manufacturer of kindred oil burning apparatus. An expansion program will be developed. John Scheminger, heretofore head of the Aetna company, and Morgan J. Hammers, president of the Nokol organization, will head the consolidated company.

The Stamford Rolling Mills, Inc., Springdale, Conn., manufacturer of brass goods, has awarded a general contract to the Bray Co., 62 Cannon Street, Bridgeport, Conn., for a one-story addition, 112 x 215 ft., to cost in excess of \$75,000 with equipment. It will replace a portion of the plant recently destroyed by fire. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is architect and engineer.

Barney Victor, Boston, has leased a floor in the building at 149-51 Pearl Street, owned by the Grant Gear Works, Inc., for the manufacture of electric lighting fixtures.

The Western Massachusetts Companies, Inc., Turners Falls, Mass., operating the Turners Falls Power & Light Co., and other electric power utilities, has secured a controlling interest in the United Electric Light Co., Springfield, Mass., and will operate in conjunction with its properties. Plans for expansion are under consideration, including transmission lines. The United company will proceed with the construction of a new power station at West Springfield, to cost more than \$300,000 with equipment.

The Temple Electric Light & Power Co., Temple, N. H., has been formed by Charles W. Tobey, Temple, and associates, to construct and operate a local power plant and system for commercial service in this district. It is purposed to begin work soon.

Detroit

DETROIT, Oct. 3.

THE Watts Mfg. Co., Benton Harbor, Mich., recently organized, is completing plans for the early operation of a new plant for the manufacture of chest type irons for commercial laundry service, and other kindred equipment. A building has been acquired. Robert J. Watts, Benton Harbor, is head.

The Paige-Detroit Motor Car Co., Detroit, is arranging for an increase in capital from \$1,500,000 to \$2,000,000, of which 300,000 shares will be sold at an early date, aggregating \$3,000,000. The proceeds will be used in part for expansion. The company has work under way at its local plant for an addition, primarily for the production of motors, and is completing the establishment of a new body-manufacturing plant at Wayne, Mich. The Paige Motor International Corporation, recently formed as a subsidiary to operate in foreign countries, is completing operations in this line, to include the establishment of a number of assembling plants in other countries later.

The Higgins Brass Mfg. Co., 12435 Dequindre Street, Detroit, is completing plans for a one-story addition, 80 x 200 ft., to cost close to \$75,000 with equipment. G. V. Pottle, David Whitney Building, is architect.

In connection with an expansion and improvement program now under way at Pontiac, Mich., the Grand Trunk Railroad Co., Detroit, plans enlargement in its engine house early in the coming year, increasing the facilities from seven to 28 locomotives. The work will include a new group of locomotive repair shops and car shops, with installation of additional equipment, and is reported to cost upward of \$100,000. Present work includes the construction of a new belt line railroad to cost approximately \$500,000.

The Board of Education, Almont, Mich., contemplates the installation of manual training equipment in a new high school, to cost \$150,000, to replace a structure recently destroyed by fire. The Warren, Holmes, Power Co., Lansing, Mich., is architect.

The Fisher Body Corporation, General Motors Building, Detroit, has awarded a general contract to the J. A. Utley Co., Penobscot Building, Detroit, for an addition to its plant at Pontiac, Mich., one story, 75 x 550 ft., to cost upward of \$200,000.

The Detroit Gray Iron Foundry Co., Wight Street, Detroit, has superstructure in progress on the second of two new foundry units, each two stories, reported to cost more than \$75,000 with equipment. Machinery installation will include four large core ovens, traveling crane and other equipment.

The Detroit Cab Co., 535 East Larned Street, Detroit, operating a local taxicab service, has filed plans for a new factory to be given over to parts and repair work and other mechanical production, including body work, to cost upward of \$50,000 with equipment.

The Baker Furniture Factories, Inc., Allegan, Mich., has completed plans for a three-story addition, to cost close to \$70,000 with equipment. Colton & Knecht, Grand Rapids, Mich., are architects.

St. Louis

ST. LOUIS, Oct. 3.

BIDS will soon be asked by the Universal Automobile Service Co., 633 Grand Avenue North, St. Louis, for a six-story service, repair and garage building, to cost \$500,000 with equipment. Pleitsch & Price, Arcade Building, are architects. C. R. Felton is president and general manager.

The Heine Boiler Works, Inc., 5315 Shreve Street, St. Louis, has awarded a general contract to the Fruin-Colmon Construction Co., Merchants' Laclede Building, for a one-story addition, 63 x 75 ft., to cost about \$23,000 with equipment.

The Oklahoma Gas & Electric Co., Harrah, Okla., will proceed with extensions and improvements in its local steam-operated electric generating plant, with installation of new 81,000 kw. turbo-generator and accessory equipment, to cost more than \$300,000 with equipment. The Byllesby Engineering Co., 231 South La Salle Street, Chicago, is consulting engineer. J. F. Owens is vice-president and general manager.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, has plans for extensions in its engine house at Herington, Kan., with additional repair facilities, to cost more than \$30,000. C. A. Morse is chief engineer.

The Common Council, Perry, Okla., is considering extensions and improvements in the municipal electric power plant and waterworks, with installation of equipment to double the present capacity, including 600-hp. engine unit. A traveling crane will be installed. The work is estimated to cost more than \$50,000.

The Grace Sign & Mfg. Co., 3601 South Second Street, St. Louis, has awarded a general contract to the William

H. & Nelson Cunliff Co., 410 North Euclid Avenue, for a one-story and basement plant, 75 x 260 ft., to cost close to \$75,000 with equipment. Paul R. and Leo M. Grace head the company.

Bids will soon be asked by William King & Associates, Inc., 117 South Broadway, St. Louis, for a six-story automobile service, repair and garage building, 105 x 200 ft., to cost about \$450,000 with equipment. W. J. Knight & Co., Wainwright Building, are engineers.

The Carey Salt Co., Hutchinson, Kan., will soon begin the erection of a three-story addition, 72 & 80 ft., to cost about \$30,000. Hans Von Unwerth, Finance Building, Kansas City, Mo., is engineer.

The Common Council, Woodward, Okla., plans extensions and improvements in its municipal electric light and power plant, including the installation of a new 1000-hp. Diesel engine unit and auxiliary equipment, to cost close to \$100,000. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

The Western Refrigeration Co., Kansas City, Kan., affiliated with the City Ice Co., Kansas City, Mo., has plans for a new one-story ice-manufacturing plant, to cost about \$35,000 with machinery.

The Brahm & Mitchellette Motor Co., 1049 South Boyle Avenue, St. Louis, E. A. Brahm, president, is completing plans for a two-story automobile service, repair and garage building, 85 x 110 ft., to cost close to \$100,000 with equipment. John Wunderlich, 4241 Juniata Street, is architect.

Chicago

CHICAGO, Oct. 3.

FRESH inquiry is larger than in the early weeks of September, and there is increased activity by buyers who had indicated their requirements prior to the machine tool exposition at Cleveland. Sales in the week were in moderate number. The outlook for a larger volume of business in October than in any of the three preceding months is considered favorable.

The J. I. Case Threshing Machine Co., Racine, Wis., has placed several orders against its list and the Interstate Drop Forge Co., Milwaukee, has purchased a 24-in. heavy pattern shaper. The A. O. Smith Corporation, Milwaukee, will buy 25 or more tools, including a number of shapers and lathes. The Nash Motors Co. will buy machine tools to increase the capacity of its Racine plant by one-third and will also require replacement tools for its Milwaukee plant. The International Harvester Co. is selecting several pieces of new equipment for its Moline, Ill., plant.

The Common Council, Hurst, Ill., contemplates extensions and improvements in the municipal waterworks, to cost about \$150,000.

The George D. Roper Corporation, Rockford, Ill., has prepared a development program which will extend over the next three or four years and will require an expenditure of \$1,000,000. The proposed units to be built will care for assembly, machine, sheet metal department, general offices and warehouses.

The Standard Calorimeter Co., Fifty-third Street and Second Avenue, Davenport, Iowa, will erect a factory addition to cost \$16,500.

Fire of undetermined origin caused a \$10,000 loss, Sept. 26, at the plant of the A. Lucas & Sons Iron Works, Peoria, Ill.

Samuel Olson & Co., elevator engineers, 2418 Bloomingdale Avenue, Chicago, have purchased a site, 135 x 602 ft., on North Kostner Avenue, where a two-story building with 45,000 sq. ft. of floor space will be erected. The new building will contain a machine shop, a sheet metal department and a structural steel shop.

The molding department and pattern shops of the Excelsior Stove Mfg. Co., Quincy, Ill., were destroyed by fire Sept. 23 with a loss of \$350,000.

The E. A. Baumbach Mfg. Co., 1812 South Kilbourn Avenue, Chicago, manufacturer of iron and steel castings, etc., has had plans drawn for a new multi-story addition, reported to cost about \$50,000, with equipment. C. H. Lenski, 3912 North Central Avenue, is architect.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Place, Chicago, has taken title to property on Thirty-sixth Place, comprising the block front opposite its present plant, 125 x 600 ft., and has authorized plans for a new two-story addition to occupy a portion of the site, to cost close to \$200,000, of which more than \$100,000 will be expended for new equipment.

The Friedlander Box Co., 1300 West Lake Street, Chicago, manufacturer of metal reinforced and other wood boxes, is planning the early rebuilding of the portion of its plant destroyed by fire Sept. 25, with loss close to \$30,000 including equipment.

The Columbia Wood Turning Co., 1800 South Canal Street, Chicago, has concluded negotiations for the purchase of property at Western Avenue and West Twentieth Street, 116 x 185 ft., for \$65,000. It is improved with a one-story factory, which will be remodeled for early occupancy. It is purposed to remove the present business to the new location.

The Baker Stove Works, Inc., Belleville, Ill., is said to be planning the early rebuilding of its plant destroyed by fire Sept. 26, with loss reported in excess of \$250,000 including equipment.

The Strong-Scott Mfg. Co., 413 South Third Street, Minneapolis, Minn., manufacturer of flour mill machinery and other heavy equipment, is completing plans for a one and two-story addition to cost more than \$150,000 with equipment. Actual erection may be deferred for a few months. Larson & McLaren, Baker Building, are architects. A. W. Strong is president.

C. E. Frazier, 64 West Randolph Street, Chicago, architect, has completed plans for a two-story automobile service, repair and garage building to cost about \$100,000 with equipment.

The Scientific Precision Co., Arthington and Tripp Avenues, Chicago, manufacturer of precision instruments and equipment, has leased a two-story factory to be erected by the Regan Construction Co., Chicago, 125 x 200 ft., to cost \$50,000, and will take possession as soon as completed. The present business will be removed to the new location and additional equipment provided for increase in capacity.

The Produce Terminal Cold Storage Co., Chicago, care of the H. C. Christians Co., 116 West Illinois Street, produce dealer, recently organized by Mr. Christians and associates, has concluded arrangements for the purchase of property at Fifteenth Place and Throop Street, 110 x 278 ft., as a site for a proposed ten-story cold storage and refrigerating plant, to cost in excess of \$1,500,000 with equipment.

Henry Nicolai, Montevideo, Minn., is completing plans for a one-story machine and repair shop, 50 x 84 ft., to cost close to \$18,000.

South Atlantic States

BALTIMORE, Oct. 3.

CONTRACT has been let by the Cambridge Furniture Co., Cambridge, Md., to Brohawn Brothers, Arcade Building, for a new two-story plant, to cost \$70,000 with machinery.

The Pitcairn Aviation Co., Inc., Land Title Building, Philadelphia, is completing plans for a new airport and plant at the Byrd Field, Richmond, Va., and will begin work soon on initial buildings, including hangar, shop, etc., with about 15,000 sq. ft. of floor space.

The Tri-State Culvert Mfg. Co., 491 South Second Street, Memphis, Tenn., manufacturer of steel culverts, etc., has acquired property at Atlanta, Ga., as a site for a new branch plant, to be one story and cost about \$21,000.

The Greater Greenville Sewer District Commission, Greenville, S. C., is asking bids until Oct. 18 for electrical equipment for use in connection with a proposed sewage disposal plant. E. H. Fry is superintendent.

The Board of District Commissioners, District Building, Washington, has authorized plans for an addition to the Murry vocational school, O Street, N. W., estimated to cost \$150,000, for which it is expected to ask bids on a general contract early in December. A. L. Harris, District Building, is municipal architect.

The Waverly Marine Railway, Inc., Waverly Mills, S. C., is considering the construction of a new shipyard for boat construction and repair service, to cost upward of \$25,000 with equipment. It is proposed to purchase marine railroad equipment and other machinery.

The Southern Power Co., Charlotte, N. C., is arranging an expansion and improvement program during 1928 to cost approximately \$25,000,000, including the completion of power projects now in progress, additional power stations, transmission lines, etc.

The Hackley Morrison Co., Inc., 204 North Jefferson Street, Richmond, Va., machinery dealer, has inquiries out for a gasoline-driven shovel, about 1/2-yd. capacity; also for an electric grinding machine, bench type, with 6-in. diameter emery wheel.

The Board of District Commissioners, District Building, Washington, is asking bids until Oct. 10 for 1895 brass couplings; also for 2080 brass corporation cocks, and 1620 brass curb cocks.

The Tidewater Power Co., Wilmington, N. C., will take

bids at once for a one-story equipment storage and distributing plant, to cost close to \$45,000 with equipment.

The Hancock Motor Co., 1223 Church Street, Lynchburg, Va., has awarded a general contract to the J. P. Pettyjohn Co., Lynchburg, for a new three-story building to cost about \$90,000. The entire second floor will be equipped for a machine, repair and parts department. Johnson & Brannan, People's National Bank Building, are architects.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a Corliss engine unit, 125 to 150-hp. capacity; also for industrial motors, including a 50-hp., 3-phase, 60-cycle a.c. electric motor.

The Appalachian Electric Power Co., Bluefield, W. Va., is planning the installation of an automatic electric power station on the Pigg River, near Rocky Mount, N. C., to replace a present hydroelectric generating unit at that point, now obsolete. The new plant is reported to cost in excess of \$75,000. The company is said to be planning the construction of an automatic power substation in the Peakland section, near Lynchburg, Va., and will build a new transmission line to this location.

Traveling and reel oven equipment, mixing, conveying and other machinery will be installed in the new six-story and basement plant, 100 x 140 ft., now in course of erection by the Southern Biscuit Co., Richmond, Va., to cost about \$500,000, and scheduled to be ready for operation early next year. Francisco & Jacobus, 511 Fifth Avenue, New York, are architects and engineers.

The Potomac Edison Co., Cumberland, Md., is arranging for a stock issue of \$2,650,000, a portion of the proceeds to be used for extensions and improvements in power plants and transmission lines. The company is affiliated with the American Water Works & Electric Co., New York.

Cincinnati

CINCINNATI, Oct. 3.

WHILE a few machine tool builders report that business in September was better than in August, the majority state that the past month was one of the poorest of the year. The lack of buying is ascribed chiefly to the postponement of purchases until after the National Machine Tool Builders' Exposition in Cleveland. It is conservatively estimated that approximately 400 tools were sold at the exposition, but sufficient time has not elapsed to evaluate fully the sales benefits to be derived from it. The number of inquiries before the trade, however, give promise of an improvement in bookings during October. Many railroads this month are making up their budgets for the coming year and are expected to place orders for tools in November, but buying is not expected to be on a sizable scale. A company in Louisiana has bought a 1500-lb. single frame steam hammer.

Plans have been filed by the Fairmont Creamery Co., 229 West Spring Street, Columbus, Ohio, for a new four-story cold storage and refrigerating plant, with one-story automobile service, repair and garage building for company cars. The entire project will cost about \$130,000 with equipment. F. V. Thomas is company engineer.

The Streine Tool & Mfg. Co., New Bremen, Ohio, is said to be planning the installation of an overhead traveling crane, 10 to 15 tons capacity, and one or more smaller cranes.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until Oct. 14 for 17,000 engine bearings for Liberty type engines, circular 104; until Oct. 10 for 30 pressure gage testers and 30 thermometers, armored, circular 100 and for eight unit heaters, circular 62.

The Henry Vogt Machine Co., Tenth and Ormsby Streets, Louisville, manufacturer of refrigerating machinery and parts, has awarded a general contract to the H. A. Doll Co., Louisville, for a two-story addition, 85 x 240 ft., with foundations arranged for four additional stories, to cost in excess of \$65,000 with equipment.

The Mississippi Valley Utilities Corporation, Memphis, Tenn., care of J. Edwin Conaway, Exchange Building, Memphis, recently formed under Delaware laws, will take over and expand a group of 16 ice-manufacturing and cold storage plants in Tennessee and Mississippi. A bond issue will be sold, a portion of the fund to be used for extensions and betterments in existing plants, with installation of additional equipment.

The L. J. Breed Equipment Co., James Building, Chattanooga, Tenn., machinery dealer, has inquiries out for a bolt-threading machine, single head, Landis type.

The Columbus Railway, Power & Light Co., Columbus, Ohio, is completing plans for the construction of a by-products coke plant, and the City Council is considering an ordinance permitting the company to mix artificial gas

from the plant with natural gas now regularly distributed. The entire project will cost in excess of \$2,000,000.

The G. W. Shroyer Co., North Main Street, Dayton, Ohio, representative for the Cadillac and LaSalle automobiles, is arranging for the early construction of a new three-story service, repair and garage building, 100 x 120 ft., reported to cost \$150,000 with equipment.

The G. W. Simmons Co., 605 Linden Avenue, Memphis, Tenn., has inquiries out for wood-bending machines, for the production of chair backs, McKnight or other type.

The Reeves Mfg. Co., Dover, Ohio, manufacturer of sheet metal products, has awarded a general contract to the Austin Co., Cleveland, for a new one-story plant, to cost approximately \$40,000 with equipment.

Gulf States

BIRMINGHAM, Oct. 3.

THE Todd Engineering, Dry Dock & Repair Co., Fulton Street, New Orleans, has awarded a contract to the Ingalls Iron Works Co., Birmingham, for an addition to its shipbuilding and repair plant to cost in excess of \$85,000.

Benjamin W. Frieden, Fort Worth, Tex., has plans maturing for a one-story foundry and assembling plant for the production of stoves, ranges, etc., to cost close to \$30,000 with equipment.

The Consolidated Coal Co., Birmingham, care of P. L. Dryer, Pioneer Building, consulting engineer, recently organized under Delaware laws with capital of \$1,275,000, has concluded arrangements for the purchase of coal-mining properties near Jasper, Walker County, Ala., known as the Bankhead tract, and will carry out an expansion program. The present mine has a capacity of 1500 tons per day. The new owner will install electric power equipment and auxiliary machinery, including a coal-washery and preparing plant, estimated to cost approximately \$200,000 with machinery. R. T. Daniel is president.

The Grove-Dowling Hardwood Co., Odessa and Gulf Hammock, Fla., is disposing of a bond issue of \$1,750,000, a portion of the proceeds to be used for extensions and improvements in mills and properties. W. H. Dowling is vice-president.

The Alabama Power Co., Birmingham, is said to be planning the construction of a new automatic power substation at West Montgomery, Ala., to cost \$100,000 with equipment. The company is reported to have plans for a new hydroelectric generating plant on the Warrior River, supplementing its present Gorgas hydroelectric power station, to be located in Walker County. The new plant will be equipped for a capacity of 200,000 kw., and is reported to cost more than \$1,000,000 with transmission lines, etc.

The United States Engineer, Galveston, Tex., is asking bids until Oct. 19 for one vertical propelling engine of full Diesel type, circular 54.

The Citizens' Ice Co., Sweetwater, Tex., recently organized, is planning the early construction of a one-story ice-manufacturing plant, to cost about \$45,000 with equipment.

The Eastern Torpedo Mfg. Co., Odessa, Tex., D. A. Koonz, general manager, has preliminary plans for a new plant near the city, to be one story and to cost approximately \$80,000 with equipment.

The Louisiana-Arkansas Pipe Line Co., operated by the Ouachita Natural Gas Co., Inc., Monroe, La., has approved plans for the immediate construction of a new pipe line from Sterlington, La., to El Dorado, Ark., 50 miles, estimated to cost close to \$1,000,000. The line will be 16 in. diameter, and will have a capacity of about 70,000,000 cu. ft. per day, with compressor stations, etc.

The West Texas Utilities Co., Third Street, Abilene, Tex., is completing plans for a new ice-manufacturing plant at Ozona, Tex.

The Texas Power & Light Co., Waco, Tex., has arranged for a bond issue of \$4,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and properties, including transmission line construction. A. S. Grenier is vice-president.

The American Art Marble & Granite Co., 4207 Suwanee Avenue, Tampa, Fla., has inquiries out for an electric-operated sand-washing machine, with capacity of about 1/2 ton per hour.

The Gulf States Utilities Co., Beaumont, Tex., J. G. Holtzclaw, vice-president, is completing plans for an addition to its electric generating plant on the Neches River, near the city, with installation of a new 25,000-kw. turbo-generator and auxiliary equipment, to cost in excess of \$600,000, including extensions in transmission lines. Contract for primary machinery is being let and awards for other equipment will be made soon. Stone & Webster, Inc., 49 Federal Street, Boston, is engineer.

The Alt Engineering Co., Capps Building, Fort Worth,

Tex., has inquiries out for a slack line with gasoline engine-operated bucket, about 1 yd. capacity, 600 ft. span.

The Arctic Ice Co., Dallas, Tex., H. M. Price, head, is said to be planning the construction of a new ice-manufacturing and cold storage plant at Pyote, Tex., to cost about \$50,000 with equipment.

Conveying machinery, automatic packing equipment, electric power equipment and other machinery will be installed in the new packing plant to be constructed by the Texas Citrus Fruit Growers' Exchange, San Benito, Tex., to cost about \$200,000 with equipment.

The Sewerage and Water Board, 526 Carondelet Street, New Orleans, is asking bids until Oct. 21 for three 4000-hp. watertube boilers, coal pulverizers and burners, and mechanical draft fans and air preheaters. A. G. Moffat is secretary.

Pittsburgh

PITTSBURGH, Oct. 3.

WHILE Pittsburgh machine tool dealers succeeded in closing some sales at the Cleveland exposition, there has been little activity since. Numerous quotations are being made, but orders are comparatively few. The fourth quarter machine tool list of the Westinghouse Electric & Mfg. Co. has been issued and while heavy in miscellaneous items, contains only a few machine tools. The Pittsburgh Board of Education will next year erect a trades high school, which from the plans will be one of the most complete schools of its kind in the country and is expected to call for an extensive line of tools and equipment.

The Copperweld Steel Co., Braddock, Pittsburgh, manufacturer of welded copper and steel products, has acquired a tract of about 19 acres at Glassport, Pa., and is reported to be planning to use a portion of the site for expansion.

The J. A. Zurn Mfg. Co., Fourteenth and German Streets, Erie, Pa., manufacturer of plumbing equipment and supplies, has plans under way for new works, comprising a one-story foundry, pattern shop, machine shop and other structures, to cost in excess of \$225,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects and engineers.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for a quantity of gears, cut or cast teeth, steel or cast iron, 24 to 40-in. diameter, with pinions to match; also for a lifting magnet; motors, transformers, etc., and for a number of I-beam hoists.

The Weil-McLain Co., 641 West Lake Street, Chicago, manufacturer of boilers, radiators, etc., with plant at Michigan City, Ind., has concluded negotiations for the purchase of a tract of about 11 acres at Erie, Pa., as a site for a new plant, for which plans will be drawn soon. The property was formerly used by the Miner-Morse Co., manufacturer of drawn steel specialties. Several new units will be built, including a one-story foundry, work on the latter to begin during October. Erection of the main plant building is scheduled to begin in the spring. The entire project is reported to cost upward of \$300,000 with equipment.

The Monongahela-West Penn Public Service Co., Fairmont, W. Va., is said to have plans for the erection of a new steam-operated electric power plant on the Parkersburg-Elizabeth Highway, Elizabeth, W. Va., to cost more than \$50,000.

The Knox Products Co., Hersch Building, Pittsburgh, manufacturer of refrigerators, ice cream cabinets, etc., has arranged for the purchase of the former plant of the Wilmington Leather Co., Wilmington, Del., as a site for new works. The company has also taken options on adjoining property for an addition. The present works are at Beaver Falls, Pa., and will be continued, it is understood, as heretofore. Luther L. Knox, formerly head of the Blaw-Knox Co., Pittsburgh, manufacturer of steel products, is president; William H. Schutte, secretary and treasurer, and Charles J. DeMuth, superintendent.

Indiana

INDIANAPOLIS, Oct. 3.

THE Belden Mfg. Co., 2300 Western Avenue, Chicago, manufacturer of electric wire and cables, magnet wire, etc., has tentative plans under way for an addition to its plant at Richmond, Ind., to cost in excess of \$50,000 with equipment. John W. Mueller, First National Bank Building, Richmond, is architect.

The Chevrolet Motor Co., 540 East Washington Street, Indianapolis, affiliated with the General Motors Corporation, Detroit, has filed plans for a new three-story service, repair

and garage building, 65 x 200 ft., to cost close to \$100,000 with equipment.

The Board of School Commissioners, Indianapolis, is considering an appropriation of \$70,168 for the purchase of equipment for the printing shop at the technical high school. Milo H. Stuart is principal at the school.

The Spraker Mfg. Co., Indianapolis, manufacturer of automobile tools and accessories, has leased property at Martindale Avenue and Nineteenth Street, totaling about three times the present floor area at 314 East Sixteenth Street, and will remove to the new location. Additional equipment will be provided.

The Superior Paper Products Co., Fairmount, Ind., has plans for the immediate erection of an addition, 50 x 100 ft., to increase the capacity of the plant about one-third. Considerable additional equipment will be installed. The expansion is reported to cost in excess of \$50,000. W. H. Willen is one of the heads of the company.

The Board of Education, 150 North Meridian Street, Indianapolis, will soon take new bids on revised plans for the proposed three-story, two-wing addition to the technical high school, to cost about \$250,000 with equipment. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

Fire, Sept. 24, destroyed a portion of the foundry of the Anchor Stove & Range Co., New Albany, Ind., with loss reported in excess of \$40,000 including equipment. The same fire also destroyed a portion of the artificial gas works of the Interstate Public Service Co., on neighboring site, with bulk of loss confined to the retort house, estimated at more than \$80,000 with equipment. Plans are under way by both companies for rebuilding.

The Hoosier Public Utility Co., Greensburg, Ind., has been granted permission to acquire the municipal electric light and power plant at Osgood, Ind., for \$65,000 and will take over the property at an early date. Extensions and improvements are planned in this district, including transmission line construction.

A merger of the Kokomo Brass Works, Byrne-Kingston & Co. and the Kokomo Electric Co., Kokomo, Ind., into a corporation with a capital stock of \$1,500,000 has been announced. The new firm will be known as the Kingston Products Corporation and will manufacture automobile accessories. Paul Johnson will be president and general manager and Frank C. Ryan secretary and treasurer.

The Delta Electric Co., Marion, Ind., has purchased the business of the Accessories Mfg. Co., Chicago, which will be moved to Marion and consolidated with the company's present factory. It manufactures automobile headlights and other accessories.

The Maco Mfg. Co., 524 North Meridian Street, Indianapolis, manufacturer of automobile accessories, has leased building No. 2 at the Indianapolis industrial center, Nineteenth Street and Martindale Avenue.

Milwaukee

MILWAUKEE, Oct. 3.

GOOD effects from the Cleveland exposition are beginning to be felt, especially in the substantial improvement of inquiry. Sales also are tending upward, although as yet no large volume is passing. Local machine tool builders report a relatively satisfactory September business and view prospects for October with encouragement. Replacement business is the sustaining factor. Industries appear content with present capacity, judging by the dearth of important plant construction or extension projects.

The Northwestern Steel & Iron Works, Eau Claire, Wis., has started work on the construction of a machine shop addition, 50 x 100 ft., one story. The general contract is in charge of Walker Brothers, local.

The Wisconsin Electric Heater Co., Milwaukee, has been incorporated with a capital stock of \$50,000 to manufacture electric heating devices and similar apparatus. The incorporators are Henry E. Schwab and Charles Schwab, principals in the R. J. Schwab & Sons Co., 283 Clinton Street, local, pioneer manufacturer of hot air furnaces and heating boilers, which will handle the prospective operation.

The Ajax Rubber Co., Racine, Wis., which is erecting plant additions estimated to cost \$500,000 to consolidate its Trenton, N. J., works with the main factory, has acquired the plant of the former Perfex Radiator Co., Racine, and will convert it into an experimental laboratory and private garage and service building.

The Trane Co., La Crosse, Wis., manufacturer of heating supplies, is erecting a second-story addition to the present one-story portion of its works, 90 x 190 ft.

The Fort Howard Paper Co., Green Bay, Wis., has placed contracts for the construction of one-story machine room

addition, 80 x 208 ft. With equipment the improvement will cost about \$125,000.

The Wisconsin Gear Co., 251 Reed Street, Milwaukee, has incorporated as the Wisconsin Gear & Engineering Co., capital stock \$25,000. The scope of the business is in process of enlargement and later the shop will be increased in size. Christian Lauritzen continues as principal owner and manager.

The Gillette Rubber Co., 739 Wisconsin Street, Eau Claire, Wis., will add a third story to an existing two-story factory, 60 x 160 ft., and a second story on a one-story unit, 60 x 75 ft., to increase its output of tires and tubes. The Hoepfner-Bartlett Co., local contractor, is in charge of the work.

The Fuller Co., Milwaukee, has been organized to manufacture automotive specialties and mechanical devices, principally a newly patented safety nozzle for handling gasoline at filling stations. Thus far a limited production has been derived under contract, but establishment of a shop is planned. The identity of the principals is withheld, representation being by members of the law firm of Miller, Mack & Fairchild, 425 East Water Street, Milwaukee.

Cleveland

CLEVELAND, Oct. 3.

MACHINE tool sales continue light but consumers are showing more interest in new equipment than for some time. Dealers are working on prospects that developed during the National Machine Tool Builders' Exposition. However, the general attitude of many buyers is not to add additional equipment until their business picks up. Operations of metal-working plants in most industries continue slow. Interest at present is centered mostly in standard tools rather than in production machines. Orders are almost entirely for single tools and are coming from widely scattered sources, but virtually none from the automotive field. Turret lathes are showing more life and one local manufacturer reports a 30 per cent gain in business in September over August. The volume of sales by local dealers the past month, however, was barely up to that in August.

Quite a little activity has developed in wood-working machinery for furniture factories. One dealer during the week took order for 15 new and used tools from three or four wood-working plants.

The Midland Steel Products Co., Cleveland, has begun preparations for large scale production of its new mechanical steel-draulic brake. Plans include the installation of equipment for manufacturing the new product in the Cleveland plant and for the doubling of the brake producing capacity in the Detroit plant. Under the schedule now being worked out the Cleveland plant is equipping for the production of 4000 brakes daily, and the Detroit plant for 8000 brakes daily. E. J. Kulas is president of the company.

The Iron King Mfg. Co., Bradner, Ohio, is said to be planning to rebuild the portion of its plant recently damaged by fire, with loss reported upward of \$30,000 including equipment.

The Colson Co., Elyria, Ohio, manufacturer of trucks, etc., has asked bids on a general contract for a new three-story plant, 100 x 195 ft., to cost more than \$100,000 with equipment. R. W. Dalley is company engineer.

The Pennsylvania-Ohio Power & Light Co., Youngstown, Ohio, is arranging an expansion and improvement program covering a five-year period, or until 1932, including new power plants, extensions in present generating plants, transmission lines, substations and other facilities, with total expenditure in excess of \$40,000,000. During the present year, with completion of work now in progress, the expenditure will aggregate \$10,000,000 and, in 1928, about \$12,800,000.

The France Slag Co., Toledo, Ohio, is considering rebuilding the portion of its plant destroyed by fire Sept. 17, with loss reported at \$75,000 including equipment.

Pacific Coast

SAN FRANCISCO, Sept. 28.

THE California Compressed Gas Co., Sacramento, Cal., operated by the Compressed Gas Corporation, 101 Blake Street, Denver, Colo., manufacturer of acetylene welding and cutting equipment, is planning the construction of a new plant along the waterfront, 75 x 100 ft., to cost close to \$75,000 with equipment. H. R. Hood, heretofore connected with the Los Angeles plant of the company, will be superintendent at the Sacramento works.

The Western Wax Paper Co., 920 East Sixty-first Street, Los Angeles, has awarded a general contract to the William

P. Neil Co., 4814 Loma Vista Avenue, for a one-story addition, including improvements in present plant, to cost about \$20,000.

The City Council and the Board of County Supervisors, San Francisco, jointly, are planning the construction of new car and repair shops for the street railroad system; a bus service, repair and garage building will also be constructed for this department of the lines. The entire project is estimated to cost about \$450,000, for which it is proposed to arrange a bond issue. M. M. O'Shaughnessy is city engineer.

The Southern California Edison Co., Los Angeles, has approved plans for a new automatic power substation at Orange, Cal., to cost about \$65,000 with equipment. Following its recent bond issue, the company has arranged for the sale of preferred stock in amount of \$1,750,000, a portion of the proceeds to be used for expansion in power facilities and transmission lines.

The Zenith Aircraft Co., Santa Ana, Cal., Charles F. Rocheville, general manager, is planning the construction of a new one-story plant at Westminster, Cal., 60 x 113 ft., to be equipped largely for aircraft assembling and to cost about \$20,000 with machinery.

The Great Northern Railway Co., Seattle, is reported to be planning the construction of new car and locomotive repair shops at Wenatchee, Wash., to cost more than \$100,000 with equipment. It is proposed to complete plans by the close of the year and to begin actual construction early in 1928.

The City Council, Seattle, has approved a fund of \$3,400,000, for the construction of a power dam and tunnel at Diable Canyon for a proposed hydroelectric generating plant at that point, and will arrange additional funds soon for the power station and transmission lines. This project is expected to cost about \$6,000,000. It is purposed to begin work in the near future on a power dam at Ruby Creek, for hydroelectric power development in that section.

A proposed bond issue of \$85,000 for the construction of a municipal electric light and power plant at Buhl, Idaho, recently announced, has been defeated by a vote of citizens, and the City Council will hold the project in abeyance.

The Rainier Pulp & Paper Co., White-Henry-Stuart Building, Seattle, a subsidiary of the Zellerbach Paper Co., San Francisco, and Sacramento, Cal., has taken title to a tract of 250 acres at Port Townsend, Wash., as a site for a new paper mill, for which construction will soon begin. It will be equipped for an initial output of 150 tons of finished paper per day and is estimated to cost close to \$1,000,000 with machinery. V. D. Simons, 435 North Michigan Avenue, Chicago, is engineer; Baar & Cunningham, Spalding Building, Portland, are consulting engineers.

The Noble & Wood Paper Machine Co., will open a Pacific Coast headquarters in Portland, with Daniel Arpin district manager.

Canada

TORONTO, Oct. 3.

WHILE large lists are absent, machine tool dealers and builders report a steady flow of small orders for one, two and three tools. New inquiries are appearing in satisfactory volume and it is the opinion of the trade that business the last three months of this year will be better than that in the last quarter of 1926. Some good sized lists are expected from the General Motors Corporation, Oshawa, and the Willys-Overland, Ltd., Toronto, for additions now under way. The Canadian railroads have been making some replacement purchases for various car shops and plants.

At the monthly meeting of the directors of the Steel Co. of Canada, Ltd., held at Hamilton, Ont., Sept. 28, it was stated that about \$2,000,000 will be spent during the current year on plant development, and it is the belief that further expenditure will be necessary in modernizing the present plant. This will involve the purchase of considerable new machinery and tools. The Dominion Iron & Steel Corporation, Sydney, N. S., and the Algoma Steel Corporation, Sault Ste. Marie, Ont., have also spent upward of \$250,000 each on plant improvements this year, and it is believed that other expenditures are contemplated.

The city of Oshawa, Ont., proposes to purchase a new electric pumping unit for the lake pumping station. D. G. Conant is chairman of the Board of Water Commissioners, and W. C. Smith is city engineer.

The City Council, Hamilton, Ont., has passed a by-law authorizing the borrowing of \$400,000 for extensions to the hydro-electric power plants in the city. S. H. Kent is city clerk.

The Nova Scotia Steel & Coal Co., Trenton, N. S., is contemplating building an addition to its bolt plant.

The city of Sherbrooke, Que., will build a power plant and dam at the Westbury power site on the St. Francis River, at an estimated cost of \$500,000. Antonin Deslauriers, city clerk is receiving bids in connection with the undertaking.

The Bates Valve Bag Co., Cap de la Madeleine, Que., will build a one-story, 80 x 200 ft., concrete and brick addition to its plant, to cost \$100,000.

The Werlich Mfg. Co., Preston, Ont., will build a one-story factory, 60 x 144 ft., of concrete, brick and steel construction.

The W. H. Yates Construction Co., 17 Main Street East, Hamilton, Ont., has the general contract for building a brass foundry and chemical laboratory, including core and melting building, for the Canadian Westinghouse Co., Hamilton, Ont.

W. H. Yates Construction Co., Toronto, has the general contract for a \$100,000 addition to the plant of the Willys-Overland, Ltd., Toronto.

D. Barclay, 24 Melville Avenue, Guelph, Ont., has been awarded the general contract for a \$10,000 addition to the plant of the Callander Foundry & Mfg. Co., Guelph.

The Oldsmobile Motor Co., Vancouver, B. C., proposes to start work soon on an addition to its plant to cost \$3,000,000.

Foreign

THE Government of Brazil, Rio de Janeiro, has recently granted a concession to a local company for the construction of a new iron and steel plant, including blast furnace with minimum capacity of 150,000 tons per annum. Full information, including name of company, details of equipment, etc., are at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 255721. The American Consulate, Rio de Janeiro, Edwin V. Morgan, American ambassador, also has data regarding the project.

Feinstahlwerke Traisen-Leobersdorf A. G., 1 Landskron-gasse, Vienna, Austria, is in the market for an American conveying belt for use in its steel casting plant to cover various operations, including the cleaning department.

NEW TRADE PUBLICATIONS

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin 151, announcing a new line of totally inclosed, self-cooled, pipeless air-jacketed motors; the single-phase repulsion-induction type ranges from 1 to 20 hp., and the polyphase squirrel-cage comes in sizes from 2 to 30 hp. Bulletin 152 deals with the company's across-the-line standard squirrel-cage motors with ratings up to and including 20 hp.

Small Tools and Machinery.—Joseph T. Ryerson & Son, Inc., Chicago. Catalog 27, 272 pages, 8½ x 5½, bound in cloth, completely covering the company's metal-working small tools and machinery. The catalog itself contains list prices and specifications and there is a special supplement which provides f.o.b. points, discounts and other price information. The book is completely indexed and every effort has been made to simplify purchases.

Automatic Valves.—Gordon-Anderson Valve Specialty Co., Fulton Building, Pittsburgh. Bulletin, describing with photographs and specifications the company's automatic valves for power plants, waterworks and railroads, especially adapted for steam and water service. Of particular interest is the automatic test feature on some of the valves which provides for testing from the boiler room of valves at any point in the plant.

Electrical Equipment.—General Electric Co., Schenectady, N. Y. GEA-6A, devoted to the company's "500 Series" general purpose constant speed types KT and KQ squirrel-cage motors; GEA-9S, concerned with the type BSR 60-cycle, single-phase adjustable varying speed motors; GEA-164B, concerned with the type RP metal melting pots and equipment; GEA-246A, dealing with the "7500 Series" types TS and QS general purpose synchronous motors; GEA-267, describing the CR-103S motor-starting switches for small induction motors; GEA-712, treating of the type BTA adjustable speed, alternating current, brush shifting motors; GEA-787, given over to the "500 Series" vertical induction motors of the squirrel cage and wound rotor types; GEA-795, devoted to the type ML air compressor governors; GEA-80S, concerned with the new form R totally inclosed induction motor of the "500 Series" of the squirrel and wound rotor types; GEA-811, describing the CR-1923-A1 alternating current jack type disconnecting switches for single-phase, two-phase,

The Union d'Electricite, Paris, France, is planning the construction of an addition to its steam-operated electric generating plant at Vitry, with installation of generating machinery and auxiliary equipment to increase the capacity by 533,000 hp. The company is identified with the International Power Securities Corporation, 40 Wall Street, New York, which has disposed of bond issues in the United States.

The Punta Alegre Sugar Co., Province of Camaguey, Cuba, has arranged for the sale of a note issue of \$4,000,000 in the United States, a portion of the proceeds to be used for extensions and improvements in mills and property. The company and its subsidiaries operate three mills, with aggregate annual output of about 1,500,000 bags of raw sugar. The property includes railroad facilities, with 240 miles of track, 27 locomotives, 1300 cars, shops, etc. W. C. Douglas is president.

In connection with a program for port development, the Municipal Government, Marseille, France, is arranging to begin work on the first section of the project, comprising the transformation of the Joliette Basin, estimated to cost 52,000,000 francs (about \$2,000,000), of which more than three-fourths will be defrayed by the Marseille Chamber of Commerce. The work will include warehouses and terminal structures, estimated to cost more than \$2,000,000 with traveling cranes and other hoisting, conveying and mechanical handling equipment to cost approximately 12,000,000 francs (about \$470,000). The project is described in an official French publication, "Projets d'Amelioration et d'Extension du Port," on file at the New York district office of the Bureau of Foreign and Domestic Commerce. The American Consulate, Marseille, William E. DeCourcy, vice-consul, also has information regarding the enterprise.

The London Power Co., London, England, has plans under way for the construction of a new steam-operated electric generating plant at Battersea, to be equipped for an initial capacity of 350,000 kw. A transmission line will be built. The project is reported to cost in excess of \$3,000,000.

Roberto Hernandez, 1834 Broadway, New York, has an inquiry from Spain for information concerning machinery for manufacturing lead pencils and steel pens.

three- or four-wire, or three-phase circuits; GEA-812, telling of the company's air heating units for heating small dry compartments, storage rooms, etc.

Drills and Tappers.—Barnes Drill Co., Rockford, Ill. Bulletin dealing with the No. 242 self-oiling, all geared gang drill with a capacity of 1½-in. in steel. Detailed description of the machine's various features is included, together with photographs and full specifications. Another bulletin is similarly concerned with a self-oiling, all geared, all ball bearing drill and tapper.

Steel Castings.—Sivyer Steel Casting Co., Milwaukee. Leaflet devoted to the company's steel castings and their uses. Of especial interest is a table showing the representative physical properties of annealed and heat treated castings.

Speed Transmissions.—Stephens-Adamson Mfg. Co., Aurora, Ill. Leaflet, describing the new JFS variable speed transmission ranging in transmitting capacities from ½ hp. to 15 hp. and providing a range of speed variation of about 5 to 1.

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